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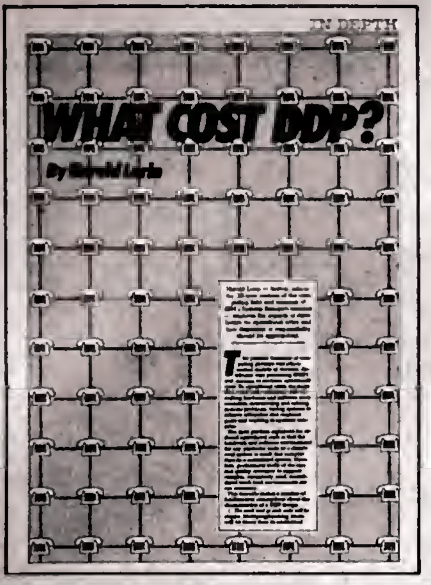
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WHAT COST DDP?

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IN DEPTH

Current Methodologies in Structured Design

By David King

IN DEPTH

As the decade begins to unfold, data processing managers are facing unprecedented new opportunities and challenges. The author pinpoints five areas that he considers the hallmark concerns for DP management in the '80s.

Management Concerns in the '80s

Five In Depths Follow Page 77

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NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Designer Shortfall To Plague '80s

By Lois Paul
CW Staff

WASHINGTON, D.C. — There will be a glut of programmers in the 1980s, but not enough software designers to show us how to put things together.

That was one prediction offered by James R. Porter, vice-president of Informatics, Inc., in a discussion of "The New Software Economics and Problems of the '80s." Porter made his remarks here last week before those attending the National Conference on Software: Critical Decisions.

He outlined a few other "guesses" about the '80s, including the following:

- "The day is near when there will be a computer in every business and perhaps in every kitchen."
- Software will become a household word as well as a recognized asset that will appear on a company's

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DEC Ties DDP To Plant Control

By Tim Scannell
CW Staff

MERRIMACK, N.H. — Digital Equipment Corp. last week launched a three-tiered hardware, communications and software program that allows manufacturers to mingle the techniques of distributed data processing with factory automation and process control.

Introduced by DEC's Manufacturing, Distribution and Control Product Group and described as more of a concept than a collection of products, Unified Plant Management allows manufacturers to build information and control systems within a plant environment and to distribute the resulting data throughout the entire corporation.

(Continued on Page 2)

Senate OKs Bell Deregulation Bill

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Senate telecommunications deregulation bill, which would free AT&T to enter data processing and unregulated communications markets, was overwhelmingly approved Wednesday.

After four days of debate that featured a minifilibuster by Sen. Ernest F. Hollings (D-S.C.), who called the bill a "bad measure" that would "extinguish competition" rather than promote it, and after numerous amendments were disposed of, the legislation passed on a 90 to 4 vote.

The bill now goes to the House of Representatives, which will take up its own telecommunications deregulation bill later this year. The House bill is expected to be very much different from the Senate bill, making it difficult to speculate on when and how the two might be resolved.

The Senate legislation would allow AT&T to establish a "fully separate affiliate" to offer unregulated services and products. The Federal Communications Commission would have oversight of the establishment of the subsidiary and transfer of assets, equipment and facilities to it from the parent. The commission would have the authority to regulate the transition process to preserve competition.

Hollings, the only member of the Senate Commerce Committee to oppose the bill, argued it did not offer sufficient safeguards against cross subsidization between AT&T and its proposed subsidiary. Most of his efforts to amend the bill were unsuccessful.

He had wanted AT&T equipment in use by commercial and private customers at the time of deregulation to

(Continued on Page 7)

IBM Mum, But Revamp May Bode Well for Users

By Marcia Blumenthal
CW Staff

How IBM will implement the massive reorganization it announced recently is still up in the air. IBM is revealing few details about the reorganization and the silence is expected to continue until early next year, a spokesman said.

One clear point is that by folding all of its U.S. marketing and sales organizations into a unified group, IBM will now be able to let its users buy all their IBM products from a single sales organization, a move observers contend will benefit the users and increase IBM's profits.

How IBM will handle its accounts is the key to the reorganization. A spokesman said IBM is currently deciding which accounts will be handled by which division. Some industry analysts speculate IBM will put all Fortune 1000 companies in one division and "all the rest" in the other division or that it will put the top 2,000 customers in one unit, with the remaining users comprising the other division. All agreed that account management is a major key to the reorganization.

IBM flatly denied it would segment its accounts on such an arbitrary basis and said it is using several vari-

(Continued on Page 4)

By Brad Schultz
CW New York Bureau

ANN ARBOR, Mich. — IBM's recently announced reorganization should bode well for end users, DMW Group President Dixon R. Doll told *Computerworld* last week.

IBM has found it must buck tradition by selling more to end users, rather than corporate DP departments, the consultant and lecturer observed. Moreover, end-user departments are where the three principal technologies of information processing — computing, communications and office systems — are melding rapidly.

This integration of technologies, which has led many companies to merge DP and telecommunications departments, has conflicted with IBM's arrangement of marketing divisions, Doll noted. Moreover, another trend — the blurring of distinctions between minicomputers and mainframes, between intelligent terminals and microcomputers and between other product classes — also clashed with IBM's organizational structure, he said.

Thus, prospective IBM customers have wrestled with several IBM bureaucracies in trying to fashion coherent DP solutions, Doll remarked.

(Continued on Page 5)

'Wait Until '83,' FCC Orders Ma Bell

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission has lengthened the implementation schedule for deregulating AT&T, hoping a more gradual entry of the firm into unregulated equipment and services markets will ease the impact on users, competitors and commission staff.

The commission extended from March 1, 1982 to Jan. 1, 1983 the date for deregulating new equipment offerings and affirmed its earlier decision to phase in deregulation of existing equipment over several years.

The decision came last Wednesday

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DEC Ties DDP to Plant Control

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Modular in design, UPM not only can be used to distribute production and control data, but also reportedly tightens planning and execution functions and allows the user to measure process performance more effectively, according to Roger C. Cady, DEC's vice-president.

As part of the UPM debut, DEC also announced a Comprehensive Application Program (CAP), through which manufacturers can buy software from a DEC-recommended supplier or from DEC itself; a new version of its Decdataway local area networking product, this one geared for its 32-bit VAX-11 computers; and two DEC-written manufacturing applications software packages.

Although DEC has offered applications software for its business users, this recent announcement marks the first time the firm is offering inhouse applications software for its manufacturing user base, Cady said.

Three Parts

Basically, UPM consists of three parts: DEC hardware, the communications capabilities provided by Decdataway and the applications programs offered by both DEC and outside suppliers.

When pieced together, UPM allows users to manipulate and communicate administrative and production control data by taking advantage of a variety of already established technologies. These technologies include real-time control, modeling and simulation and office automation.

While the concept is based on DEC's PDP-11 or VAX-11 CPUs, the heart of UPM is DEC's local-area networking product which has been in existence for 16-bit machines since 1976. Decdataway uses multidrop twisted-pair cable to link VAX computers with up to 31 PDP-11/23 microcomputer-based subsystems. Stations can be located up to 15,000 feet from the host computer system, Cady stated.

Block Mode Communication

Decdataway communication is carried out in a block mode and managed by a microprocessor-based controller that frees host resources from the demands of juggling network traffic. In addition, each VAX-11/780 or VAX-11/750 can handle up to four Decdataway configurations, he said.

The VAX-11 DY32 Decdataway license and support costs $25,000. Deliveries are scheduled for January 1982.

Since DEC's VAX VMS operating system is fully compatible with the PDP-11's RSX-11M operating system, programs are completely compatible. In addition, current manufacturing users of PDP-11-based factory systems can integrate UPM into their corporate design, Cady explained.

DEC said it sees shop floor control and distributed office automation as the two areas that offer the most growth potential in the computer-based manufacturing area. Presently, about 23% of the firm's systems are installed in manufacturing environments. Finally, to provide software to its manufacturing users, DEC instituted CAP, which in essence is a single-source supply for applications programs. CAP is composed of four components:

- A referral program, which is an extension of DEC's Application Software Kit and describes application software available from a variety of software houses.
- A recommended marketing program, which provides users with software that has been tested, audited and recommended by DEC.
- An external applications software library, which is set up as a kind of software clearinghouse.
- DEC's own software products.

Applications Packages

Thus far, DEC has two applications packages, both unveiled last week: the VAX manufacturing control system (VMCS), which performs manufacturing resources planning in production environments; and the process monitoring & control system (PMCS), which is geared for sophisticated users in the process manufacturing industry. DEC's VMCS is already installed in four plant operations in the U.S., Cady noted.

A typical VMCS configuration averages $150,000, with delivery scheduled for late spring 1982, while PMCS costs about $42,800 plus support. To date, DEC's CAP has recommended two outside manufacturing applications programs: automated batch control software (Abcon) and Setcon, a process control and monitoring software product. Both are marketed by Setpoint, Inc. of Houston, Texas.

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IBM Reorganization Details Still Under Wraps

(Continued from Page 1)

ables to classify user accounts. The size and complexity of the user's network, the number of locations requiring support and the type of operating system used are some of the variables being juggled, the spokesman noted. Nonetheless, it appears the classification process will eventually segment accounts into high-volume and lower volume accounts, observers agreed.

IBM has also denied that the long-expected reorganization, the likes of which has not been seen since 1972, would result in layoffs or voluntary attrition arrangements for portions of the marketing force.

IBM stressed that the ultimate benefit would be to the customer. It ignored industry speculation that the reorganization was, in part, made to cut down on internal conflict between sales representatives in the various divisions who were calling on users with different but competing systems.

Besides streamlining its sales operation, the reorganization also divided its development and manufacturing efforts into two groups, with the 4341 the cutoff point for system size.

Industry experts saw IBM's move as positive both for users and for the firm's future. With internal politics and bureaucracy diminished, some IBM products — the Series 1, 5280 and System/38 — will have much greater success, observed Gideon Gartner, president of the Gartner Group, Inc.

The System/38 was disadvantaged because IBM wanted to protect the 4331, Gartner maintained. Now IBM can look at each product objectively and decide which enhancements to make based on the product's merit.

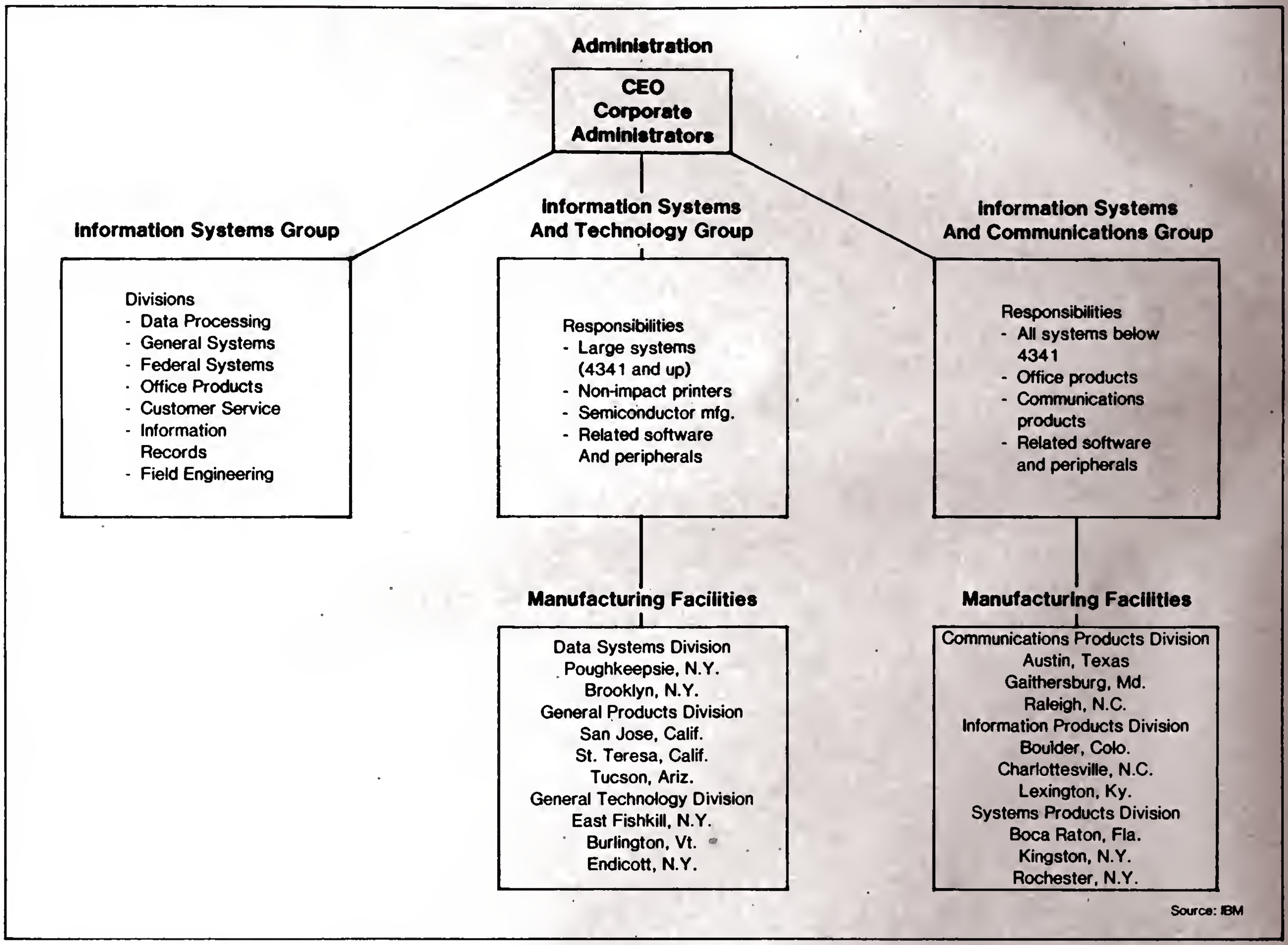
Moreover, with the introduction of the System/23 Datamaster and the Personal Computer, the divisional lines among sales units were becoming more confusing, noted Frederic Withington, a vice-president at Arthur D. Little, Inc.

IBM set up a special unit within the Data Processing Division to market the Personal Computer and the sales force within this high-end divison is already selling the Personal Computer in large quantities to its customers. The Personal Computer is also available through IBM's retail outlets as well as through certain Sears outlets and Computerland stores.

"The key is to modernize," Withington continued, noting the new sales group stresses the concept of "information" rather than DP. The firm is going for the network business of the 1990s, according to Withington.

Along with classifying its accounts, IBM is in the process of reorganizing and arranging training for its sales force, the firm said.

Although IBM denied there would be attrition among its sales people, analysts disagreed. Those currently selling high-end technologically innovative products would have a clear advantage, they said.



Source: IBM

IBM Reorganization

Reorganization Just Latest In History of Key Changes

By Tom Henkel
CW Staff

WHITE PLAINS, N.Y. — IBM's corporate structure has changed dramatically over the past 20 years, ranging from a strong central control in the late '50s to three autonomous groups aimed at target markets in the late '70s.

Now IBM appears to be striving for strong central control again. The following is a summary of key IBM reorganizational divisions over the past 20 years:

- 1956: IBM formed two basic divisions, the Data Processing Division (DPD) and the Electric Typewriter Division (ETD) —later to be renamed Office Products Division (OPD). At that time, ETD had its own development and manufacturing components. DPD and the newly formed Federal Systems Division shared the System Manufacturing and System Development divisions.
- 1965: IBM made the first major change to its then-localized computer marketing structure when field engineering support was divorced from the firm's Data Processing Division to form the Field Engineering Division.

At that time, sales, support and service worked very closely, usually out of a common local office. The move caused concern among IBM's then-growing base of users, some of which felt the organizational change would reduce field engineering's responsiveness without extra pressure from the sales force.

- 1969: IBM formed the General Systems Division (GSD) to build "low-cost data processing products" along with program assistance and support.
- 1972: IBM split its Data Processing Group into the Data Processing Manufacturing Group and the Data Processing Products Groups. At the same time, it also formed the General Business Group. Those three groups were most dramatically affected by the Oct. 1 reorganization, according to an IBM spokesman.
- 1974: IBM gave GSD marketing and service responsibilities for System/3 and System/7 processors. The move established the three-division marketing system that lasted until the Oct. 1 reorganization merged those three divisions into the Information Systems Group.
- 1980: Last August, IBM took the first steps toward consolidating its manufacturing and development efforts by merging GSD and OPD development and manufacturing into the Information Systems Division. Analysts viewed the move as both a cost-cutting effort and a realization on IBM's part that there was a significant replication of effort between the two divisions.

With the Oct. 1 reorganization, IBM took the August 1980 move one step further. IBM decided it makes two types of machines: big and small. Everything above the 4331 is considered a big system. And everything below, including office products, is considered to be in the small group.

IBM salesmen will now be able to sell all products, but they will be manufactured under the control of two different divisions.

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IBM's Changes Benefit Users?

(Continued from Page 1)

IBM's Data Processing Division was the bureaucracy for mainframes and various kinds of controllers. The General Systems Division was the bureaucracy for minicomputers.

Within DPD, IBM had a Systems Communications Division to develop data communications products and the Office Products Division for office machines.

Large and well-established accounts of IBM probably fared better in dealing with the several bureaucracies, Doll continued, than smaller and more isolated customers. IBM created national account executives to coordinate relations with major corporations that had diversified information technology needs, Doll explained. IBM had less incentive to guide small customers through its bureaucratic jungle.

But now, IBM is acting to dissolve the rivalries, inconsistencies and ambiguities among its traditional divisions through creation of three marketing groups: Information Systems; Information Systems and Technology; and Information Systems and Communications. The new order should greatly improve the IBM customer's ability to transmit requests for help with procurement, support and maintenance, Doll said, and should help IBM comply with those requests. Doll termed the new order "a product bag of goodies, inexorably intertwined."

The DMW Group president recalled that the problems within IBM that account for this reorganization were apparent when he helped train salespeople of the General Systems Division's Series/1 minicomputer in data communications a few years ago. IBM tended to let its Data Processing Division dominate relations with a large, diversified customer, Doll said, but the giant manufacturer's salespeople appeared confused about how to work with one another.

Internal Problems

Internal marketing problems seem the main reason for IBM's reorganization, Doll speculated, although those problems ultimately stem from technological trends, such as integration of technologies and proliferation of powerful end user-oriented systems and peripherals. A less important factor may be the weakening federal regulatory climate, as the monumental antitrust prosecution of IBM continues, Doll pointed out.

When federal policy favored tight regulation, IBM had more reason to operate several divisions in "controlled competition" with each other, similar to the way General Motors pits one car division against another.

Despite the improvements users can expect in relations with IBM, incompatibility problems must still be ironed out among IBM's vast array of products, Doll asserted. It is one thing for IBM to streamline sales of products; it is another thing for IBM to implement the protocols and interfaces necessary for products developed by different IBM divisions to work together. IBM will probably claim that its Systems Network Architecture will ensure such harmony, Doll predicted.

Revamp Has Nothing to Do With Antitrust Case: IBM

By Bob Johnson
CW New York Bureau

NEW YORK — IBM flatly denied any connection between its recent reorganization of marketing and service divisions and the U.S. government's antitrust suit against the company.

Surfacing at a time when IBM attorneys are meeting with U.S. Attorney General William Baxter in Washington, the reorganization has fueled rumors and speculation about IBM gearing up for possible divestiture.

"The reorganization has absolutely nothing to do with the antitrust case," an IBM spokesman said last week.

Asked if the Justice Department had been consulted prior to the company's reorganization announcement, the spokesman said, "We did not consult the Justice Department, the District Court or anyone else, nor did we the last time we had a reorganization."

The Justice Department had no comment.

Cal Crary, a long-time observer of the antitrust trial and litigation analyst for the Bear Stearns brokerage in New York, said that any time IBM does a little reorganizing, everyone starts yelling divestiture. "I don't think the reorganization has anything to do with the trial," he said.

Crary said IBM is very confident that it will win the 12-year-old suit. "IBM is truly optimistic. It is not just putting up a front. IBM honestly believes that there is nothing to the case," according to Crary.

The company does not need to frustrate the Justice Department with realignment of divisions, Crary noted, adding, "They (IBM) are not going to undermine any settlement talks that may now be going on, which would make Baxter mad."

A reorganization of any kind would not make divestiture impossible. It is the structure of the organization itself that counts. "IBM wouldn't change things now because it would only cause a big mess later on," Crary said.

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Size Determined Success or Failure Of User Firms' Relations With IBM

By Brad Schultz
CW New York Bureau

Major U.S. corporations seem to have coped well with the marketing structure IBM means to dissolve early next year.

A number of fairly isolated and smaller organizations with diversified information processing needs cannot say the same, a *Computerworld* poll of 13 DP executives indicated last week. All are IBM customers.

Since the mid-1970s, homogeneous IBM customers — needing only large computers or only small computers or only stand-alone office systems — were typically served by IBM's Data Processing Division (DPD), General Systems Division (GSD) or Office Products Division (OPD), respectively.

But few IBM customers will be homogeneous as information technologies integrate; "small" systems arrive with more power than "large" systems a few seasons older; and end users, in addition to DP departments, do their own hardware shopping.

Diversified Functions

These trends have diversified the functions for which DP managers and management information systems (MIS) directors are held responsible. And two or three sets of IBM salesmen have competed against each other to supply products that fill those functions at a single customer installation, the CW phone survey revealed.

A DPD representative has usually wound up as the customer's primary sales contact, with GSD or OPD salesmen cast in supporting roles. DPD's premiere status reflects the fact that mainframes and mainframe software (DPD's stock in trade) still dominate the DP executive's attention, the informal survey suggested.

IBM's largest commercial accounts — including CBS, Inc., International Paper Co. and U.S. Steel Corp. — are generally quite diversified in their information processing, but IBM normally has assigned them each a "national account executive," who is adept in coordinating orders taken by DPD, GSD and OPD.

At CBS in New York, James Walsh, MIS vice-president, said a "cooperative marketing program" between the broadcast company and IBM divisions has worked rather well for many years.

On occasion, however, Walsh has cautioned IBM salesmen against losing sight of his company's strategic plans for systems.

Salesmen for one IBM division sometimes fail to see how products they try to sell may work against the plans laid for systems from another IBM division, he explained.

The systems chiefs for International Paper and U.S. Steel expressed similar satisfaction with the way national account executives have coordinated relations between their companies and the IBM divisions that will largely be transferred to IBM's new Information Systems Group.

But their experiences contrast with those of William Harrison, a vice-president of Hartford Insurance Group in Hartford, Conn. Harrison has not enjoyed dealing with three competitive IBM divisions since GSD was spun off from DPD about seven years ago. Neither has James Beck, systems director at Harrah's in Reno, Nevada.

At Beck's company, a hotel and gambling casino, DPD salesmen answered a call for word processing equipment with specially packaged Model 8100 processors. GSD answered the same call with its 5520 workstations; OPD salesmen showed up with various office machines.

Harrah's relations with IBM have raised "fairly significant demarcation problems," Beck told CW. Three different IBM sales organizations fought each other until, Beck recalled, Harrah's told IBM Corporate to "get its act together." Harrah's opted for a deal with GSD because that division is well-staffed in Reno, according to Beck, while DPD salesmen must commute from Sacramento, Calif., to visit the western Nevada city.

Fragmented Sales Calls

Mike Trevor, who runs much of the Montana state government's DP operations, described a history of confused and fragmented sales calls by DPD, GSD and OPD representatives. As computer services administrator for Montana's Administration Department, Trevor manages an IBM 3033-based facility with five 8100s, some System/6s (from GSD) and about 400 terminals attached remotely.

Trevor turned down sales pitches for OPD's 6670 laser printer and GSD's 5520 workstations, concluding that DPD seemed to have the best understanding of what he wanted. But IBM still does not offer the Montana government "total systems solutions," Trevor complained. Like others in the CW poll, Trevor said he wondered how products from the old IBM divisions will truly work together.

At the Medical Center Hospital of Vermont in Burlington, Vt., DP Director Christian Voyt called IBM representatives "total nincompoops" for allegedly ignoring the hospital's status as what Voyt called the largest user in Vermont.

Although dependent on mainframes from DPD, the Medical Center Hospital has received salesmen from various IBM divisions who showed no interest in coordinating their efforts and wound up losing deals to other vendors, Voyt maintained.

Meetings Begin On U.S. vs. IBM

By Bob Johnson
CW New York Bureau

NEW YORK — Meetings between IBM attorneys and U.S. Attorney General William Baxter to discuss the government's 12-year-old antitrust suit against the company have begun in Washington as scheduled.

The meetings came out of a request by Baxter that post-trial proceedings, scheduled to begin Oct. 1, be delayed. Presiding Judge David N. Edelstein granted Baxter's request at the formal end of the trial here last June.

Sources close to the trial expressed hope that a settlement could have been reached when both sides finally rested their cases last spring. The pro-business Reagan administration and a statement by Baxter alluding to the possibility of a settlement spurred much of that hope.

A spokesman for IBM said that the meetings are proceeding as scheduled. The first one took place on Friday, Sept. 25.

'Wait Until '83,' FCC to AT&T

(Continued from Page 1)

when the commission met to fine-tune a number of provisions of its Second Computer Inquiry Decision. The "Computer II" decision will allow AT&T to offer sophisticated information services and terminal equipment through an unregulated, fully separate subsidiary.

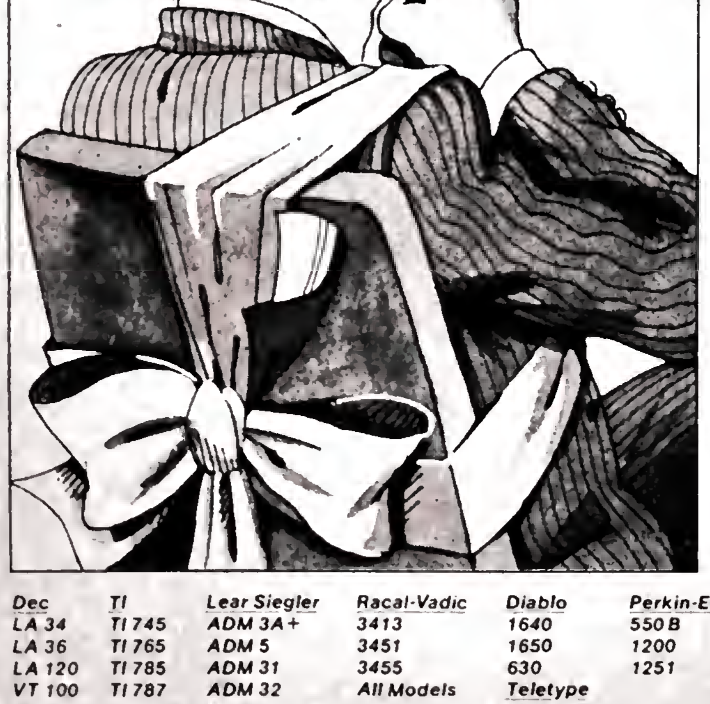
AT&T had wanted the commission to reconsider the phased-in approach and allow all equipment to be detariffed at one time — the so-called "flash-cut" method. This, the company said, would diminish any confusion in company management and among customers that might not know what part of the new AT&T organization to contact for various services.

AT&T's competitors had complained, however, that a one-step deregulation would not give the FCC enough time to valuate the billions of dollars of AT&T assets that might be moved into the unregulated subsidiary and to resolve all the transitional issues.

By rejecting flash-cut for bifurcated deregulation, the commission will take three to four years to decide the details of how to deregulate existing or embedded equipment, while at the same time the firm begins to offer new equipment and services through its separate subsidiary in 1983.

In other action Wednesday, the commission:

- Affirmed its May 7 decision to raise Bell's allowed rate of return from 10.5% to 12.75%. The commission described the increase as "appropriate and just" in light of the high cost of raising capital at current interest rates.
- Rejected an AT&T petition to offer its Custom Calling Services II directly through its operating companies.



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AT&T Bill Clears Senate With Overwhelming Vote

(Continued from Page 1)

remain in the regulated entity. Under a compromise amendment, Bell could begin transferring the equipment to the subsidiary three years after enactment of the bill and the transfer could be delayed for up to two additional years if the FCC deemed it necessary to take steps to preserve competition in the industry.

Hollings' bid to ban the subsidiary from offering services that compete with the parent ended in language to prohibit such activity for up to four years.

Outside Ownership

He spent a great deal of time pushing an amendment to make the subsidiary offer at least 10% of its stock for ownership outside AT&T and its affiliates. He argued that outside ownership interest would help deter uncompetitive practices by the subsidiary.

Hollings said he thought 30% would be a better figure, but he ended up with nothing, although the bill's sponsor, Sen. Robert Packwood (R-Ore.), did agree to have the subsidiary produce standard Securities and Exchange Commission information to help the FCC regulate its activities.

Several amendments from the Judiciary Committee were adopted to stregthen the separation of the parent and subsidiary companies, but telecommunications providers and users who opposed the legislation will probably not be satisfied with what Committee Chairman Strom Thurmond (R-S.C.) referred to as adequate safeguards against uncompetitive relationships between regulated and unregulated AT&T corporate entities.

Lease-Back Amendment

Opponents of the bill had wanted the Bell subsidiary prohibited from owning its own transmission facilities. An amendment to at least force the subsidiary to offer interconnection to its facilities on a nondiscriminatory basis and prohibit it from leasing the facilities back to the parent was defeated.

The amendment was backed by the Tele-Cause lobby [CW, Oct. 5], which noted the subsidiary could lease the facilities and services back to the parent at high rates, subsidizing the subsidiary's operations and boosting rates charged by the regulated AT&T organization. The proposal was defeated after Packwood noted that Tele-Cause includes many large firms that compete with AT&T and pointed out that the FCC would still scrutinize any dealings between the Bell entities and could step in if necessary.

Supporters of the amendment, however, noted that a recent General Accounting Office report seriously questioned the commission's ability to police the deregulation of AT&T and subsequent activities between it and its proposed subsidiary [CW, Sept. 28].

An additional amendment approved just prior to the final vote on the bill was offered to clarify the bill's application to U.S. Postal Service (USPS) telecommunications services.

Any pure telecommunications services offered by USPS would have to be through a "separate organizational entity," according to the amendment offered by Sen. Ted Stevens (R-Alaska). The amendment also made clear that the bill does not prohibit USPS from entering the telecommunications field, although several senators noted that USPS and the Senate have an understanding that no such service will be offered without the express prior consent of Congress.

S.898 Ignores Consumers: Wirth

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The head of the House of Representatives telecommunications subcommittee last week added his voice to those who argue that S.898 does not adequately address vital consumer issues.

Rep. Timothy E. Wirth (D-Colo.) told the annual fall meeting of the Computer and Business Equipment Manufacturers Association (Cbema) that S.898 "gives little attention" to competition and even less to consumer issues.

Wirth said his subcommittee's bill, expected next month, will focus more directly on the "tremendous consumer implications" of telecommunications deregulation.

He said his panel is zeroing in on users' needs "to define the barriers they face in gaining access to the services and products they need . . . to have a competitive marketplace."

Second, he said, "we have fully explored the profound First Amendment issues presented by the new technologies. We must make certain that the engineering advances we expect are matched by an equal diversity of information choices."

The third "primary goal," Wirth said, is a "fully competitive, open marketplace for telecommunications goods and services." Too often, the concept of competition is "confused with the concept of deregulation . . . Deregulation by itself will not necessarily create competition, and a market that is 'open to competition' is not necessarily competitive."

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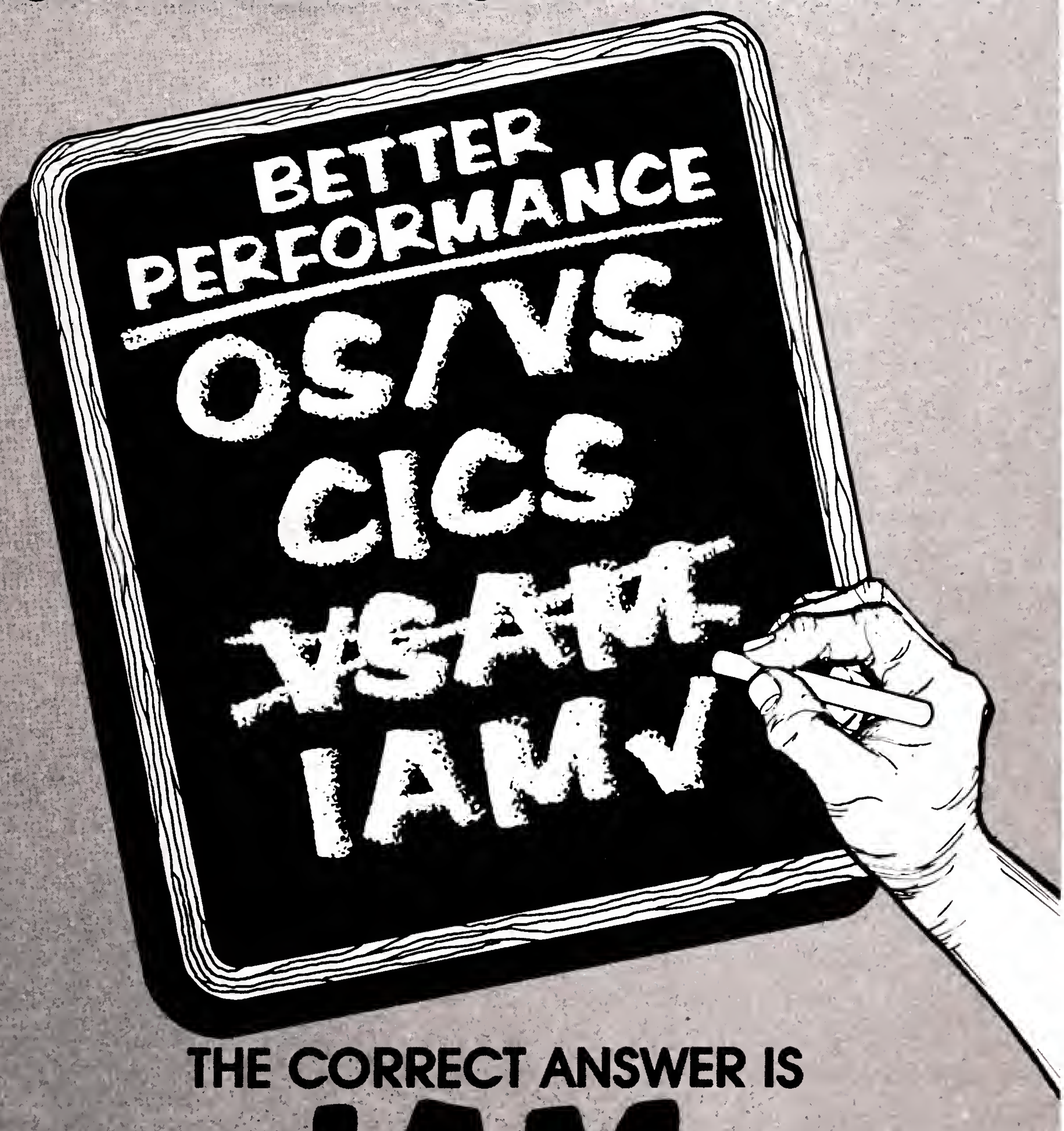

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France's Inteltext May Get U.S. Pilot Test in '82

By Phil Hirsch
CW Washington Bureau

LONDON — France's latest move to popularize its videotex/teletext technology in the U.S. is a system called Inteltext.

Roy Bright, who is in charge of marketing French videotex/teletext products abroad for the French government, said here last week that a U.S. pilot test of Inteltext is "likely" during the first quarter of next year. Bright made his prediction in an interview here before the opening of Viewdata '81, an international videotex/teletext conference.

It may be significant that when Dennis Sullivan, AT&T's assistant vice-president for residential product management and development, addressed the conference shortly after it opened, he mentioned a system similar to Inteltext as "an option we're looking at." Bright, however, said AT&T would not be involved in the upcoming pilot test.

Essentially, Inteltext divides a broadcast teletext signal into two parts. One part consists of general interest information transmitted to all viewers, such as weather reports, sports results, restaurant and theater listings. The other part consists of special interest information, for example, a listing of local night school classes, commodity market reports or a sale on lawnmowers at a local department store.

Viewer Access

The special interest information, bearing a different numeric code for each subject, is listed in an index broadcast to all viewers. To access one of these subjects, the viewer picks up his phone and conveys the related number to the data base center. He either tells a clerk at the other end of the line what he wants, or he inputs the code number through the phone's Touchtone keypad. The requested information is then inserted in one or more of the special interest frames broadcast by the teletext system.

Since Antiope, the French teletext system, uses a packetized transmission format, information requested by a particular viewer can be sent to him alone by attaching his terminal address to the related packets. Another key feature of Inteltext is that special interest information can be sent back to the viewer via either teletext or videotex, because the French technology employs a common decoder for both systems.

To be totally effective, Inteltext probably will require the Antiope decoder to have more memory than is now provided, Bright said. Otherwise, information stored on more than one frame will have to be requested by the viewer one frame at a time, and he will have to wait for it to be delivered each time — which probably would take too long. A unit capable of storing 64K- to 100K bytes of information probably would be adequate, Bright added.

An inherent shortcoming of videotex, he pointed out, is that if too many customers want the same information at the same time, they must queue up and wait.

Teletext also has some built-in drawbacks: It is a one-way information medium that sends information to the viewer but cannot, by itself, receive information from him, according to Bright.

Also, because the information frames comprising the normal teletext data base are transmitted in an endless loop, and the viewer will wait only so long, the amount of information that can be loaded into the data base is limited.

Inteltext gets around these problems, Bright said. For example, since the special interest portion of the data base is accessed infrequently, far more information can be stored at the central computer. This benefit in turn could make the whole concept of interactive on-line information services far more attractive to one-way cable TV network operators because enlarging the data base increases both the prospective user market and the possible revenue from information providers.

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Cobol Standard Open to Review

WASHINGTON, D.C. — The American National Standards Institute (Ansi) X3 Committee for Information Systems has made the proposed Cobol standard available for public review and comment.

Committee X3 here voted to conduct a four-month public review prior to voting by letter ballot on its approval of the document. Users, some of whom have already expressed serious objections to the proposed standard [CW, Feb. 2], should forward their comments to the X3 Secretariat here by Feb. 13, 1982.

The purpose of the draft is to provide a revision to Ansi's Cobol-74 standard that will give "improved capabilities and clean up the existing specifications," a spokesman said.

Eleven Modules

The draft proposes 11 separate modules, three of which are optional. The eight required modules are Nucleus, Sequential I/O, Relative I/O, Indexed I/O, Interprogram Communications, Segmentation, Sort-Merge and Source Text Manipulation. Debug, Report Writer and Communications are optional modules.

New capabilities added to the Cobol language include structured programming constructs, nested programs and reference modification. The proposal also includes modifications to several specifications that should improve Cobol definition and use, according to the spokesman.

A list of the differences between the Cobol-74 standard and the proposed revision are contained in the document, which is formally identified as dpANS X3.23-198X. Copies of the proposal are available for $25. Orders or comments may be sent to X3 Secretariat, Cbema, Attention: dpANS X3.23-198X, Suite 1200, 1828 L St., N.W., Washington, D.C. 20036.

Conspiracy Nets Gopal Jail Term

SAN JOSE, Calif. — The president of a Sunnyvale consulting firm has been sentenced to two years and eight months in prison for conspiring to steal electronic secrets worth an estimated $10 million [CW, Dec. 8, July 20].

In sentencing Peter K. Gopal last week, Judge Peter Stone of Santa Clara County Superior Court issued warnings to "those who engage in industrial piracy" as well as to the industry at large. "The industry itself is not entirely blameless," Judge Stone said. "Its record of . . . increasing its own security and self-protection is abominable."

In what prosecutors called a major industrial espionage trial in the history of Silicon Valley, Gopal was convicted last July of bribery, conspiracy and possession of stolen property. He was accused of heading a theft ring suspected of diverting secret electronics designs to the Soviet Union.

Telephone Circuit, Cable TV Mix Explored

AT&T Sharpens Focus of U.S. Videotex Plans

By Phil Hirsch
CW Washington Bureau

LONDON — AT&T's future plans for a U.S.-based videotex system came into sharper focus here last week.

Dennis Sullivan, AT&T's assistant vice-president for residential product management and development, provided some details at Viewdata '81, an international videotex conference.

A system utilizing a conventional telephone circuit to transmit the viewer's query to a computer center, and a one-way cable TV channel to deliver the requested information is "one option we're looking at," Sullivan said. Cable TV has the bandwidth needed to support animated display advertising, color photography and other features of what he called a "high-resolution video purchasing service," one likely AT&T videotex offering.

Other Possibilities

Bell is also, apparently, looking at electronic banking; news, weather and sports information; electronic message services; and financial assistance — for example, income tax help, bill-paying services and personal investment management/analysis. Sullivan mentioned all of these applications.

Sullivan did not describe in any detail the hybrid network AT&T is "looking at." Observers here suggested one way it might work is by interfacing cable TV and telephone transmission facilities to a videotex data base through Bell offices, many of which are now equipped with electronic switching systems (ESS) that could serve as communications front ends for the data base computers.

The French already are working on a system similar to the one mentioned by Sullivan. Called Inteltext, it will probably undergo a pilot test in the U.S. early next year, according to Roy Bright, chief international marketer for French videotex/teletext technology.

The reason for this interest in hybrid videotex networks was suggested by another Viewdata '81 speaker, Mark Foster, chairman of Microband Corp., headquartered in New York.

"The high cost of installing two-way cable systems makes it imperative to seek an alternative approach. We believe that a hybrid distribution system using cable or microwave broadband downstream with telephone return upstream will be totally adequate for most home interactive services for the remainder of this century," Foster said.

Presumably, these facilities will be provided at least partly by the "Digital Termination Services" (DTS) recently authorized by the Federal Communications Commission (FCC). One of the first companies to file an application for a DTS authorization was Tymnet, Inc., which, along with Microband, is a subsidiary of Tymshare, Inc.

Sullivan said AT&T was "encouraged" by its discussion with the British aimed at resolving incompatibilities between the "presentation level protocol" (PLP) Bell announced in Toronto last May and the British alpha-mosaic formatting scheme.

As a result of these differences, the British are generally considered to be at a disadvantage in their competitive struggle with the French and Canadians for primacy in the U.S. videotex/teletext market. (The French and Canadians both support PLP.)

Although the British will not admit their technology's appeal was dimmed, they have been striving ever since last May to work out a compromise with AT&T while touting the growing acceptance of Prestel elsewhere. Richard Hooper, Prestel's managing director, pointed out that seven other countries now have Prestel systems in operation, and a total of 18 have adopted Prestel standards.

Cept Coding Scheme

Meanwhile, the Conference of European Postal and Telecommunications Administrations (Cept) — an association embracing all the western European telecommunications administrations — has adopted a teletext display coding scheme that will not obsolete terminals and data bases that support the existing British alpha-mosaic coding scheme. Hooper said that talks are under way between Cept, the FCC and the State Department aimed at persuading the U.S. government to support adoption of the Cept protocol as a worldwide, international standard.

Hooper — like Sullivan — was optimistic about the talks with AT&T, which are aimed basically at working out an international standard that would include roughly equal parts of the Cept and PLP schemes. The negotiations are "continuing" and "cordial," and both organizations "are looking seriously for ways of resolving the incompatibility," he said.

But it was clear from what Hooper and Sullivan said that most, if not all, of the disagreement remains to be resolved.

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"IT PAYS TO HAVE THE RIGHT CONNECTIONS"

Shortfall of Software Designers to Plague '80s

(Continued from Page 1)

balance sheet.

- Taxing authorities will become more predatory, aggressive and interested in software. The software industry will have to develop powerful advocacies within legislation.
- Productivity will be recognized as a management issue, rather than the problem of the university or the technical area.

The combination of decreasing hardware cost, increasing exposure of young children to computers and the proliferation of personal computers is contributing to the creation of DP pressure points, Porter maintained.

There is a greater demand for increased software output, coupled with budgetary constraints. In the next two or three years, the supply of processor capability may exceed the ability of the user community to put the hardware into service, Porter predicted.

Whereas a variety of forecasters individually came to the same conclusion that 80% of the dollars will be channeled into software and the remainder into hardware, this has not been the case in the last four years, according to Porter.

"The DP dollar is still being spent on hardware. Therefore, the dollar for software is being squeezed just as hard," he said. Since hardware dollars are not decreasing, more applications will have to be developed.

With the increasing complexity of software development, what Porter called "make-or-buy economics" has shifted dramatically toward the decision to buy.

Problems with software include difficulty in design and implementation and the fact that it is people-intensive, Porter noted, adding that 67% of the total effort expended on software products during their life cycle goes toward repairing them.

More than 500,000 programmers are attacking a backlog of 10 million programs, Porter said. However, universities are producing only about 11,000 computer science graduates each year, and 30 or 40 large companies will absorb these. The demand for programmers, therefore, is growing by 20% per year.

"I don't have to tell you that the headhunter who brought you a programmer this year will steal him back next year. Search firms are getting rich at our expense and they are probably making more money than any of us," Porter said.

Growth of 320%

The DP industry is expected to grow by 320% between 1955 and 1985, yet programmer productivity is slated to increase by only 3.6%. As more people join a project, communication difficulties increase and time and mistakes go up inordinately, he observed.

Software products as package entities overtook custom software in 1980, he said, noting that industry pundits say the package business will continue to grow, becoming an $8 million industry by 1985.

Porter expressed the hope that the Commission of Software Issues in the '80s will have some answers for current problems. "Our business probably holds the greatest promise for the DP industry in the future," he said.

Corrections

In a Sept. 28 article about Control Data Corp.'s 110 personal computer, the Visicalc software package was incorrectly attributed to Unlimited Software, Inc. Personal Software, Inc., of Sunnyvale, Calif., markets Visicalc. The firm also said it does not currently offer its product on the Xerox Corp. 820, as indicated in the accompanying chart.

In the Sept. 28 In Depth article entitled "Computing Education: The ACM Model," the story on Pages ID/22-ID/23 should have been entitled "A Glimpse at the ACM Information Systems Curriculum." The article was written by Jay F. Nunamaker, who should have been listed both as professor of management information systems and computer science and as chairman of the Department of Management Information Systems at the University of Arizona.

The seminar that BBN Information Management Corp. is holding on Oct. 29-30 in Chicago and Nov. 9-10 in Los Angeles is entitled "Electronic Mail Seminar" [CW, Sept. 28].

Color graphics capability was mistakenly attributed to Boole & Babbage Inc.'s VAM/SPF software package [CW, Sept. 21]. The enhanced version of VAM/SPF reportedly eliminates the need for a TSO environment for the IBM System Productivity Facility and supports multiple concurrent users within the same MVS address space. It does not include color graphics, however.

The headline over the story announcing Time Share Corp.'s TSC 2308 microcomputer [CW, Sept. 21] should have read, "TSC Turnkey Supports WP, Accounting Applications."

The seminar that Precision Visuals, Inc. will sponsor in Boulder, Colo., on Nov. 16-17 is on device-independent computer graphics, not independent computer graphics [CW, Sept. 21].

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At First Symposium

Software Commission Targets Key Issues

By Rita Shoor
CW Staff

WASHINGTON, D.C. — One year after calling for public assistance in its research efforts [CW, Oct. 13, 1980], the Commission on Software Issues in the '80s held its first symposium here last week.

Formed in April 1980, the commission's objective was to "report on the issues as it saw them in an objective way in order to help decision-makers identify issues of importance," according to Chairman Daniel T. Brooks.

"In the early days when machines cost millions of bucks and a programmer cost about $8,000 per year, software could be given away," he said. "That's not true any more," Brooks said. At least 22 computer information industry associations expressed agreement with this view of software's increasing importance by joining the Software Commission federation.

Four Major Areas

The commission formed task forces to explore four major software areas: education and training of software professionals, software protection, software taxation and software standards. Each of these groups was charged to "actively seek public comment from interested parties" and then to identify and report on the results and progress of the research during the symposium.

The education and training task force attempted to define and report on social, economic, technical and legal issues arising from the development, distribution and use of computer software.

Specific attention was given to current definitions of a software professional, predictions for the type and number of software professionals required by the computer industry, availability of education and training resources for the software professional and current and future education and training problems. Judging from the active discussion this group's report provoked among symposium attendees, DP-related education remains a major area of concern for information systems specialists.

The task force on software taxation was to define, analyze and report on controversies arising from the application of local, state and federal tax laws to computer software and transactions. Chaired by J.T. Westermeier, a representative from the Data Processing Management Association (DPMA), it presented overviews of both state and federal software taxation and a special report on "Educating Taxing Authorities" from DPMA members S. Vajda and R. Sherin.

The Software Protection Task Force explored proprietary interests in software including copyright, patent, trade secret and other forms of computer software protection. This area is "a mishmash of words and disagreements to the layman," according to James R. Porter, vice-president from Informatics, Inc. Representing the Information Industry Association, chairman Robert S. Willard defined current legal issues and described alternative methods of protection.

Lastly, the task force on standards, headed by Nander Brown, representing the EDP Auditors Association, reported on issues related to the advantages and disadvantages of software standards from the perspective of developer, vendor and user.

Stressing that the commission functions as an "issue-spotting-, issue-identifying-, issue-focusing" mechanism, Chairman Brooks maintained that it "would leave action on the issues to the interested parties."

The commission is still seeking public feedback in its areas of concern. Comments should be addressed to Brooks at 6106 Lorcom Court, Springfield, Va. 22152.

Local Net Tools Seminar Topic

MINNEAPOLIS — Architecture Technology Corp. will present a series of two-day seminars on local network equipment held in several cities this fall.

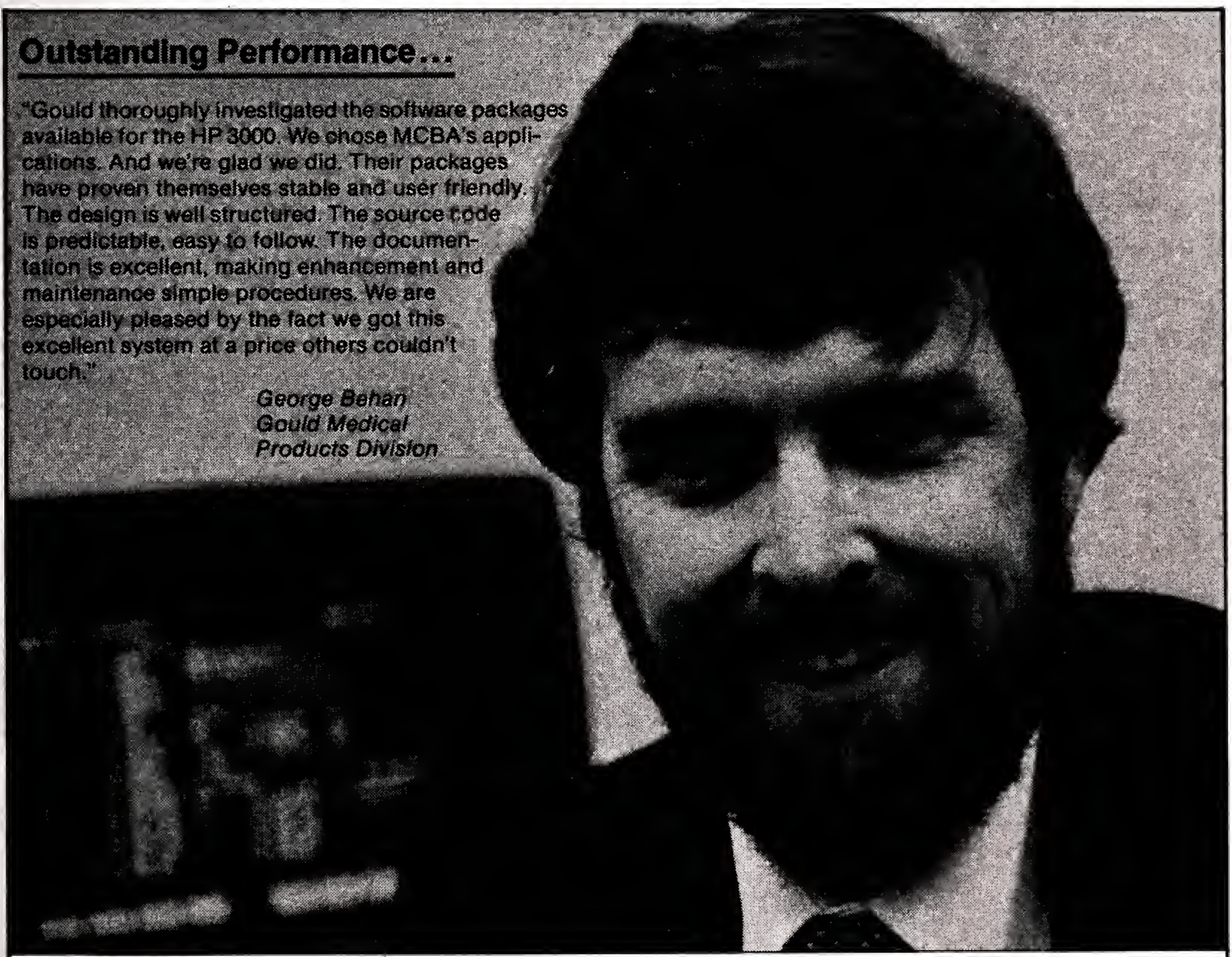
The seminars will include comprehensive descriptions of the most significant product equipment concepts in the local network field, as well as discussion of applications. The material is intended to help attendees select, design and plan local networks.

Speakers include Dr. Kenneth J. Thurber, president of Architecture Technology, Inc., and Dr. Harvey A. Freeman, vice-president for engineering at the firm.

The seminars will be held in Atlanta, Oct. 22-23; Los Angeles, Nov. 5-6; Washington, D.C., Nov. 12-13; San Francisco, Dec. 3-4; and Phoenix, Jan. 21-22.

The registration fee for the seminars is $275 plus a $22 charge for the textbook.

Architecture Technology can be reached through P.O. Box 24344, Minneapolis, Minn. 55424.



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CW 10/12

McCracken: Software Faces Seven Major Issues

By **Rita Shoor**
CW Staff

WASHINGTON, D.C. — Computer software will affect such diverse areas as economics, public safety, the judiciary process and education on a worldwide basis during the next decade.

Such was the judgment Daniel D. McCracken presented to the Commission on Software Issues in the '80s during its symposium here last week.

"The good news is that we are, in a certain sense, the victims of our own success," the consultant said. Programmers have performed successfully enough to make users increasingly aware of computer systems' capabilities. But this very success means that the industry "faces a lot of problems," McCracken said.

Seven Issues

Those problems coalesce into seven major issues, he said. The first is that of software protection. No one argues the point that it is necessary and socially useful and "there is no controversy about an inventor being entitled to the fruits of his labor." But "the implementation is another story" — one that involves such basic issues as a reclarification of some technical terms.

The term "compilation," for example, brings to mind a process perceived as mechanical by most computer programmers, McCracken said. However, the same word implies the act of anthologizing various works into a new product. This process means "creating a new work" to the copyright office and thus negates the idea of copyright infringement.

"The way we in DP use that word is the exact opposite of the way the copyright office uses it," he pointed out. This type of vocabulary problem must be resolved in order to effectively implement software protection, he said.

Issue number two is tied to software taxation. Maintaining a layman's viewpoint, McCracken limited himself to noting that "a lot of legislative education is needed" in this area.

The quality of service provided by the computer industry is another area of concern, he continued. "The ability of the industry as a whole to supply these support services will probably set some limit on our growth," he speculated.

The accountability of people working in the computer field must also be addressed, according to McCracken. Computers are used right now to design airplanes and subway systems, he pointed out. "Do you want your life to depend on software that you wrote?," was his rhetorical question. Professional certification would provide a partial answer to this problem, he said. It would not solve everything, "but it's an effort that must be made."

Another major issue involves the shortage of technical personnel — a shortage that is part of a "general education crisis." This in turn leads to issue No. 6 — the effort to increase the productivity of DP professionals who are already a part of the labor force. Maintaining that "trying to improve productivity with the wrong tool isn't going to solve anything," McCracken reminded his audience that "new techniques tend to come through new users . . . students don't know that it just isn't so."

With the disclaimer that he was a "spectator in this sport," the consultant concluded by pointing to the need to keep track of language standardization. The generation of a standard "doesn't guarantee that vendors will do anything about it."

Package Sharing Impacts Vendors

By **Lois Paul**
CW Staff

WASHINGTON, D.C. — The "manual network" in large companies, whereby a group of microcomputer users share a licensed software package, is the area of most concern for vendors, according to Daniel Flystra, chairman of Personal Software, Inc.

Flystra spoke before attendees at the National Conference on Software: Critical Decisions here last week on the topic of "Developing, Marketing and Acquiring Software for the Mass Market."

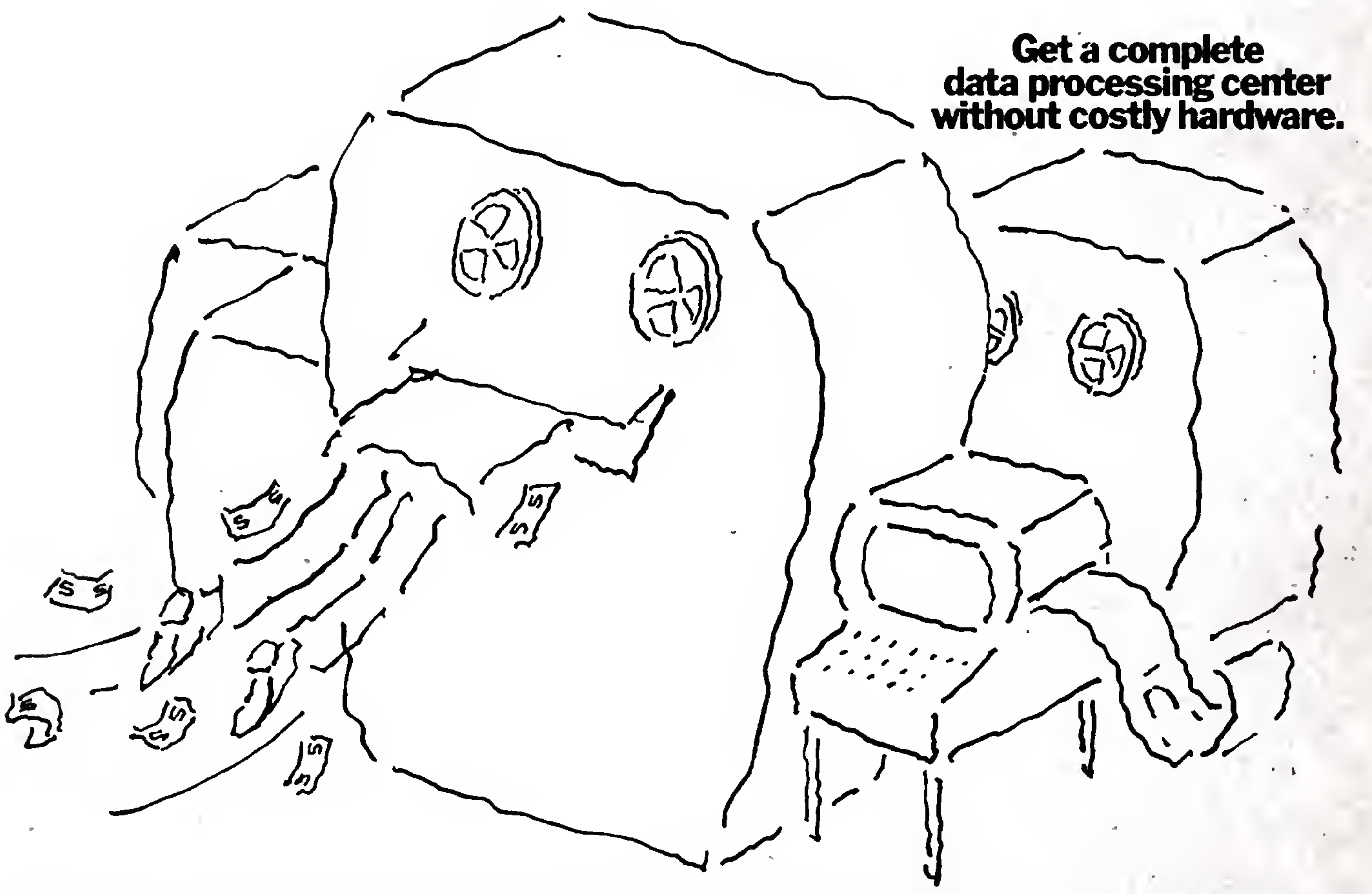
The "manual network" begins with one person using a package and eventually grows until up to five users, on the same floor of a company, for example, are sharing it.

"There is nothing you can do to prevent that from happening," he said, except perhaps to require a license for each copy for each machine.

This involves a large chunk of the total available market, Flystra said. "We need to have that come under control." The next step, he said, will be electronic, rather than manual, networks whereby packages are "shared" electronically.

"Then we really do have a problem getting paid in that situation," he said, adding that it will involve licensing individual customized copies for each particular machine.

There are various categories of infringement perpetrators, he explained, ranging from the casual individual "pirate" to organized professionals "in the business of turning a buck."



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Need to Develop Tools, Techniques

Exec: Software Measurement Top Priority

By Lois Paul
CW Staff

WASHINGTON, D.C. — "I consider measurement to be the single most important technical issue of the '80s," Jean E. Sammet, manager of IBM's division of software technology, told attendees at the National Conference on Software: Critical Decisions here last week.

In a presentation entitled "Some Important Technical Issues of Software in the '80s," Sammet stressed the need to develop tools and techniques for measuring all aspects of software development.

"The sheer fact is, we don't know what the devil we are doing ... About the only thing we can say is Joe Blow spent months working on this," she said.

Tools are needed to estimate the original task, Sammet explained, noting that in many cases in which project managers are blamed for software being late or over budget, it may really be that the estimate was lousy.

"You cannot produce a baby in one month, even if you put nine women on it," she quipped.

Measurement Tools

Also needed are measurement tools for designing, coding and testing, Sammet said, adding, "The only one we really have is the utterly dreadful, idiotic source lines of code."

There are no good measures for individual and group productivity and for languages, she said. Regarding estimates to completion, she said these often turn out to be as misleading as "50% done in January, 75% done in February and 20% done in March."

There should be a means of determining that certain parts of a program may be more difficult to write than others, she continued.

A last area that needs measurement is quality of software, Sammet said, adding that this often depends on the area in which the software is being measured.

Sammet divided software technical issues into two categories: direct aids to users and tasks for the professional software community. She said the end user's objective is to increase the effectiveness of his organization, not to solve computing problems.

Among the software methods she outlined to improve end-user productivity is the need for reusable code, which Sammet described as "one of the major technical issues of the 1980s."

"I think we can develop reusable modules if we really try," she said, acknowledging that currently there are barriers to doing this, such as project managers who demand reports "yesterday."

Also important is providing end users with easy ways to define and correctly execute programs, Sammet continued. This calls for more nonprocedural languages, specialized programming languages such as Automatically Programmed Tools and Cogo, application-based systems and knowledge-based systems.

"We need to use software technology to manage software development better," she said. Measurement is a key element in this area, according to Sammet, along with the development and enforcement of standards.

She suggested the integration of office systems and DP facilities, which long have been at odds for "political" reasons.

Sammet also pointed out the importance of minimizing problems end users face because of computing facilties. DP professionals have to improve the reliability of software by designing quality in from the beginning and by improving the serviceability of errors that are found, she said.

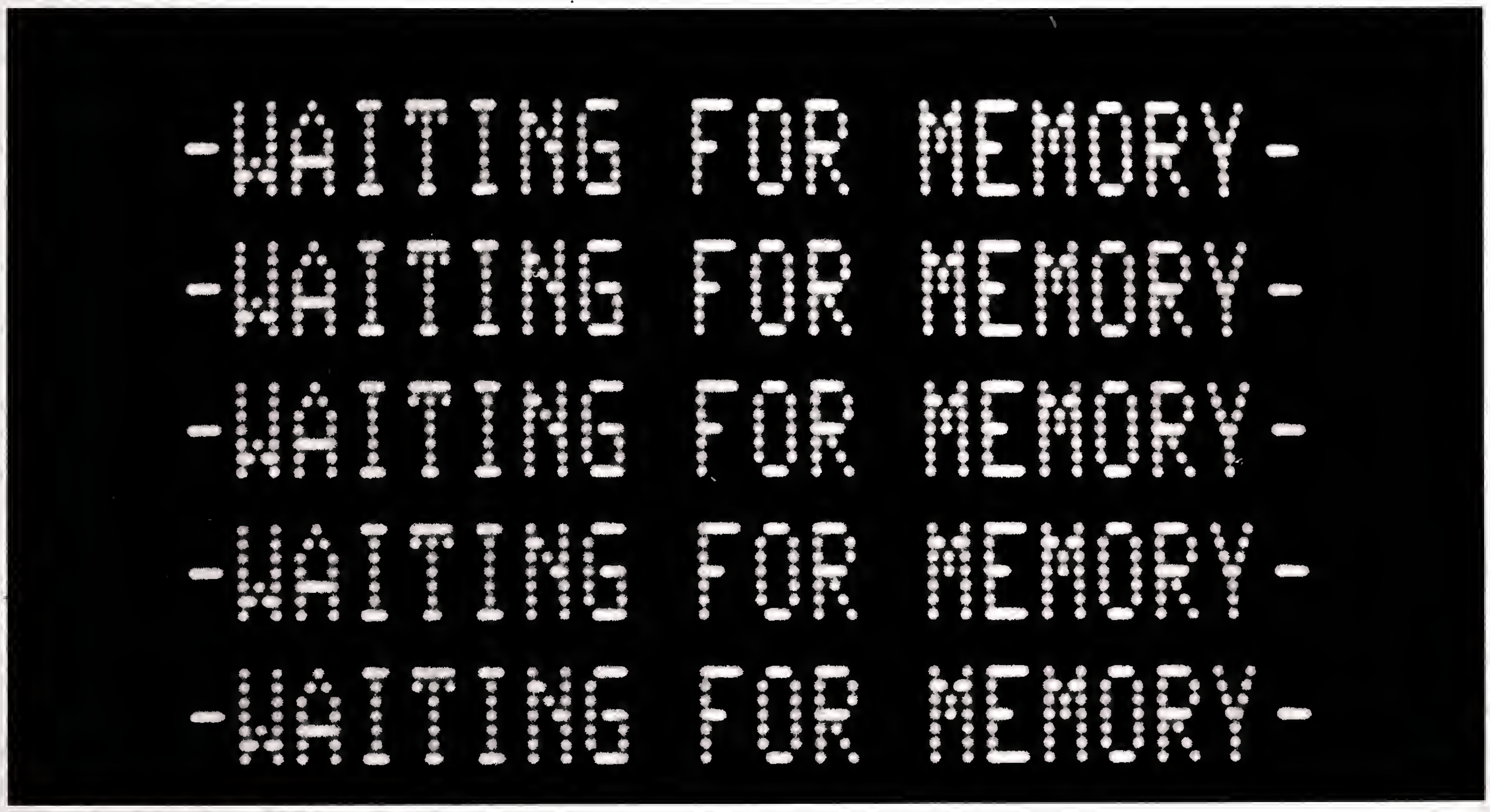
Among the issues she described for the professional software community are technology transfer, which she described as the shifting and use of good ideas; provision of easier communication with the computer for the end user; and the clarification or elimination of boundaries that exist.

The latter includes computer science vs. software engineering, software vs. hardware and office systems vs. DP. Unless we can clarify these areas and their distinctions, we should eliminate dual terminology.

The software community should obtain maximum benefit from the Ada language, which Sammet described as being "of value to more than just the Department of Defense (DOD) and its contractors."

She said Ada is more than just a language and involves reusable modules and modern programming methodology. "My personal opinion is that it was an excellent development that was well managed by the DOD," she said. Maximum opportunity was availability throughout its development for input from the DP community, she added.

At a seminar on Ada, Sammet said one manufacturer described how he was using an Ada program to control the microwave ovens he produces.



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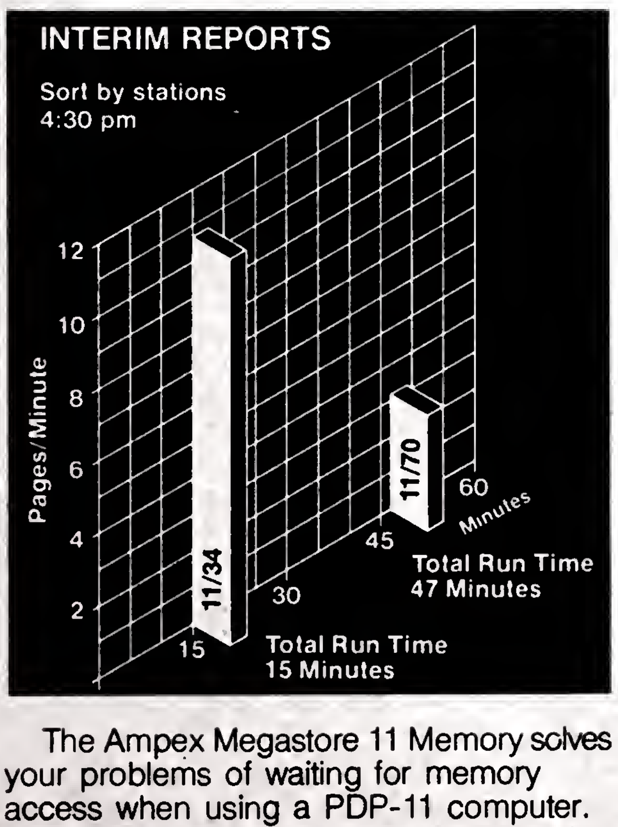

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Education Task Force Issues Preliminary Report

By Lois Paul
CW Staff

WASHINGTON, D.C. — A lively discussion followed the release here last week of the preliminary report of the Task Force on Education & Training of Software Professionals.

The report was presented at the National Conference on Software: Critical Decisions by the task force, which is part of the Commission on Software Issues in the '80s.

The decision was made in April to focus on the following limited number of issues as they relate to software professionals:

- The definition of software professionals.
- Quantity and quality of software professionals.
- Entry-level education.
- Continuing education and training.
- Certification and licensing.

Under each issue, the task force listed some of the major points of view. For each of these, they outlined a possible set of impacts and alternatives or solutions.

For example, under the quantity and quality of software professionals, there were two points of view. The first indicated that the industry needs software professionals who have a practical rather than theoretical orientation.

Impacts of this approach included a mismatch, which may become critical, between the demand and supply for theoretically trained professionals. Among alternatives suggested were that theoretically trained professionals need to have practical training and experience and college and university curricula could be designed to supply industry demand.

The second point of view was that industry demand for software professionals exceeds feeder system supply. Impacts of this view included the fact that more software packages may be developed and development of productivity tools may increase. Among alternatives offered were creation of an institute to develop a national information policy and standardization of job titles and expectations.

Audience members questioned the preliminary findings, offered suggestions and comments and made recommendations of further areas for study.

A representative of Execucom Systems Corp. asked what type of software professionals need to emerge during the 1980's and what type of education and training must be developed to enable them to produce the type of software that is needed.

A representative from the Nova Scotia Department of Education suggested that the "user gap" between computer professionals and end users should be examined.

The education system is not supplying the necessary programmers and by the time training programs are set up to offset this demand, the training will no longer be needed. "I hope through this commission we can leapfrog some of these problems," he added.

On the issue of DP certification, he said, "I would hope that industry would develop products sufficiently oriented to the end users so that certification becomes unnecessary."

Author Daniel D. McCracken said the task force report "sounds as if you think in an ideal world there will be one curriculum . . . turning out professionals who are highly competent, productive the first week and not too theoretical.

"You don't believe that," he said. "I don't mind diversity too much. We are not that good at developing curriculums [sic] that will be good 10 to 20 years from now."

He questioned the pointing of fingers at universities to explain productivity problems. "If some of the computer science graduates happen to end up in the wrong job, that is not the university's fault."

Regarding the need to hire more faculty, McCracken said, "That is funny, considering there are openings all over the country that cannot be filled. Making the computer science departments' alleged excess theoreticality the whipping boy is not going to help."

Dearth of Professors

An audience member cited the American Academy of Engineers' projections of a dearth of professors in the late '80s and early '90s as a result of students' failing to go on to higher degrees because they can accept high salaries within industry.

There are a large number of non-U.S. citizens, particularly from Southeast Asia, teaching in the computer science and engineering departments, he said, and this lack of educators in these fields should be addressed more thoroughly by the task force.

A representative of the Association for Education Data Systems suggested that too much emphasis was being placed on university training. "At what job levels are degree programs truly necessary and is a college or university the best, only or worst place to train professionals?"

A professor from the University of Tennessee's computer science department advised the task force to look at what constitutes good training and what it prepares people for by contrasting what is offered at the high school, college and trade school levels.

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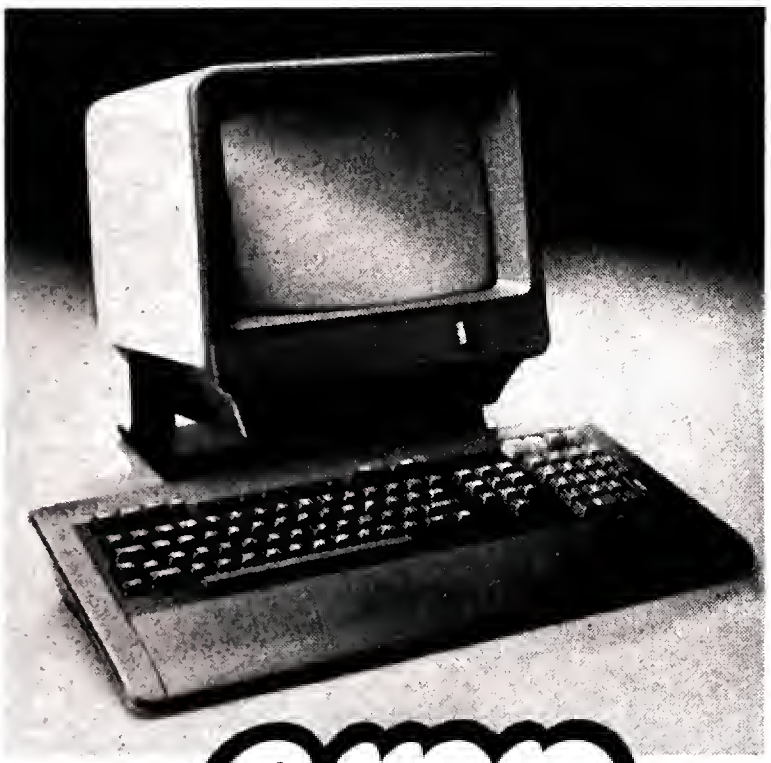

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Both Are Manufactured Products

Goetz Urges Same Law for Software, Hardware

By Lois Paul
CW Staff

WASHINGTON, D.C. — Software product companies and their products have all the characteristics of traditional manufacturing companies such as IBM, General Motors Corp., Sunbeam, Inc. and RCA Corp. All laws that apply to hardware should apply to software as well.

These views were expressed by Martin A. Goetz, senior vice-president of Applied Data Research, Inc., here last week at the National Conference on Software: Critical Decisions.

Goetz took issue with beliefs held by "some leading computer people" that software is a service, should be in the public domain and should not be taxed.

"A software product goes through an entire manufacturing and engineering process, starting from research, development of specifications, design, coding, testing, quality assurance, production of copies, maintenance and reengineering of the end product," Goetz explained.

Publishing vs. Manufacturing

Confusion exists because many regard software companies as being in the publishing rather than in the manufacturing business. Supporting documentation does not provide a valid argument that a software product sold by a software company is akin to a book sold by a publisher, he said.

IBM's announcement that it will have a Software Publishing Department for its new personal computer has added to the controversy, according to Goetz.

Many of today's issues have their roots in the way software was originally perceived and marketed in the days when programs were given away "free" by the hardware manufacturers.

Shared Misconception

"Programming was viewed as simply writing a set of procedures that mirrored the company's requirements or that computerized a clerical function," Goetz said. The problem is that many organizations still share this misconception and it is being perpetuated by talk of programs being published. "Many users still do not realize that a computer program is a machine process that must operate perfectly in a machine environment."

The controversy surrounding software protection and taxation revolves around these issues, leading to questions such as, "What is software?" and "Is software tangible or intangible?"

Goetz offered the following definition: "Software is a machine component or a computer system similar to a memory-, a disk-, a tape-, a terminal- or a CPU component." He pointed to the example of a data base machine or an application machine as indicating that the software or the microcode is an essential component of the hardware.

His major conclusions were that software products are tangible entities and should be subject to taxation just the same as hardware products. "As a $2 billion industry, why should software be exempt from taxes?"

Software products are property and are not part of the public domain. They are products and not services and, as such, should qualify for investment tax credits, Goetz said.

Professional Endeavor

Software products are constructed or built and should be able to be capitalized. They can contain a unique, patentable process and copies of a software product can be protected under the copyright law, according to Goetz. Software products fall into the engineering disciplines and are a professional endeavor.

One of the concerns expressed by Goetz was a lack of standards and programming control regarding microcomputer software. There is much software pirating and programmers are receiving open invitations to moonlight in this field, he continued.

"Users may pay dearly for this uncontrolled programming . . . I fear that in the frenzied panic to develop software for the personal computer, the user will again be burned." This will not happen if we recognize software as a component of hardware, he said.

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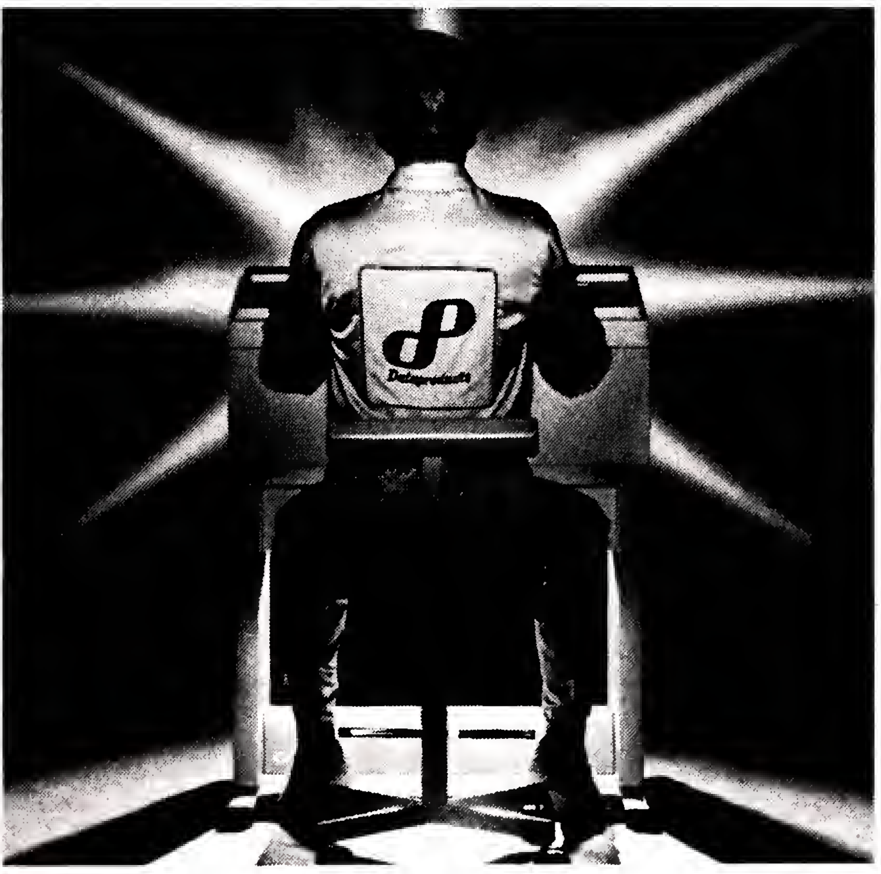

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Congress Blasts USPS for Costly Ecom System

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service (USPS), just three months away from inaugurating its domestic electronic mail service, was taken to task by a congressional subcommittee last week for developing a system far more expensive than originally proposed.

Already sensitive to criticism the USPS might use its Electronic Computer-Originated Mail (Ecom) service to get a foot in the door of the point-to-point telecommunications market, Senior Assistant Postmaster General James Finch calmly defended the system against the sometimes spirited attacks of Rep. Glenn English (D-Okla.).

Finch did not dispute English's figures, which showed USPS spending almost $32 million for Ecom, compared to the $7.4 million recommended by the Postal Rate Commission (PRC) when it approved the Ecom proposal.

But, Finch told English's Goverment Information and Individual Rights Subcommittee last Monday the system is virtually identical to what the PRC approved. He attributed the cost differences to the effects of inflation since the system was designed and to a number of essential items unexplainedly left out of the PRC recommendation.

Added Costs

Finch said, for example, the original proposal did not include $4.1 million in maintenance, spare parts and test equipment; another $7.2 million for systems engineering, test and acceptance, documentation and training; and an extra $1.1 million needed for system software.

While English said he found the cost figures' disparities astounding, he said he is more concerned with what the additional outlays will do to Ecom rates.

When the system goes into service in January, the rates are set at 26 cents for the first page of each letter (in batches of 200 or more) and 5 cents for each additional page.

Finch said he did not want to guess what the additional USPS costs will do to the rates, but conceded under subcommittee prodding that "common sense would say it would be a substantial increase."

The exact figure will not be known, he explained, until the system is operational and the Post Office can study it more closely. "We're anxious to find out what the costs are and file an appropriate rate" request with the PRC, he said.

The USPS will also pursue, before the rate commission, a request to allow access to the system through magnetic tape, Finch added. Current plans call for access only through telecommunications links.

It might be more practical for some mailers to deliver to a post office a tape of large mailings rather than send the data over a telephone line, he explained. He also said the USPS has no plans to ship such tapes around the country from one post office to another.

Opponents of Ecom have argued a supposed plan to ship tapes would put the USPS in a good position to later argue that Postal Service telecommunications links should be established to save money, allowing the USPS to offer point-to-point communications services.

Discussing access to the 25 post offices that will serve Ecom, Finch said the USPS will give priority to communications carriers who want to serve all 25. The ports have not been parceled out yet, according to Finch, who noted the final USPS rules on Ecom access were scheduled for publication last week.

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Could Affect U.S. Multinationals

UN Working to Set Data Flow Code of Conduct

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Compounding the worries of U.S. firms trying to temper transborder data flow regulation in other industrialized countries, a United Nations organization that champions developing nations' causes is now working toward a data flow code of conduct for multinational corporations.

In a Geneva meeting last month, the UN Centre for Transnational Corporations (CTC) presented a report that pointed to the imbalance between developed and developing nations in the capability to conduct and receive the benefits of international data flows.

Inasmuch as the center has a mandate to study the "implementation of policies and measure to strengthen the negotiating capacity of developing countries" in relation to transnational corporations, the entry of the center into the already crowded field of data flow discussions is a potential problem for U.S. multinationals.

The U.S. State Department has tried to advance data flow discussions in forums relatively friendly to the U.S., such as the Paris-based Organization for Economic Cooperation and Development (OECD). To date, the department has downplayed the CTC's activities, noting the center is only beginning its study and is years from any data flow code of conduct, if indeed one is ever produced.

However, reports from Geneva emphasized that the CTC paper was received enthusiastically, with many delegations urging further study in the area to be given high priority within CTC with an eye to concrete action, such as a code of conduct for multinational firms in their data flow activities.

Technological Advantage

While the CTC report is very preliminary in nature — focusing attention on definitions and descriptions of present international information networks and data flows — it does emphasize the technological advantage of the developed world over less developed nations.

"Transborder data flows may . . . lead to an accentuation of existing imbalances — and, in fact, the emergence of new sets of imbalances — between the developed and developing countries," the CTC report said. However, it added "these flows may become an instrument for the advancement of the development objectives of the developing countries."

A "key issue," the study concluded, is how to assure that "the entire international community can participate in the opportunities created by transborder data flow." Now, the CTC report said, "the production, processing, transportation and distribution of machine-readable data for commercial use are almost exclusively a phenomenon of the developed market economies."

The report pointed out the U.S. is the terminus for much, if not most, of the worldwide "raw information" flows and the generator and exporter of most of the marketed information equipment and services. It added that "data export for processing abroad comes to be regarded in an information age in the way the export of raw materials for manufacture abroad is regarded in an industrial age — as the best way to fall behind; as a mark of underdevelopment."

This situation raises serious questions of national sovereignty for developing nations, the report said:

"Uneven access to the international data market and varying capabilities to utilize fully the underlying technology and equipment may even affect, to the extent that transborder data flows involve the 'migration of key decision-making functions'

(Continued on Page 20)

INTRODUCING A SOFTWARE SYSTEM DESIGNED BY AUDITORS FOR AUDITORS.

Switch to Minis Nets Vice-Presidency

When Analyst Talked, E.F. Hutton Listened

By Jeffry Beeler
CW West Coast Bureau

NEW YORK — To a great extent, Vincent Pica owes his current job to a report he wrote in 1976 while he was still working as a "cost analyst" for E.F. Hutton Co., the Wall Street brokerage house.

At the time, the firm's in-house computing capability was limited primarily to just four large-scale mainframes, which could accommodate only a function of Hutton's total information-processing work load. The rest of the company's computing activity was divided among 16 outside time-sharing services, which together constituted a large expense item.

A careful analysis of Hutton's time-sharing costs eventually convinced Pica that some 60% of the company's externally processed jobs could be performed just as effectively and much less expensively in-house.

The problem with trying to reduce the firm's dependence on time-sharing support was that Hutton's existing host processors were already heavily burdened and lacked the capacity to shoulder a large number of extra jobs. So Pica proposed an alternative: He urged the company to install its first in-house minicomputers and use the machines as a partial replacement for the outside time-sharing resources.

Dedicated Minis

By shifting some of its applications burden from external facilities to a group of dedicated minis, Pica reasoned, Hutton's computing department could significantly cut its costs without increasing the demands on the company's existing host mainframes.

The results of the time-sharing cost analysis were later detailed in a report that eventually caught the eye of Hutton's executive vice-president of operations. So impressed was the vice-president by the study's recommendations that he approved the minicomputer installation plan outright and appointed Pica to oversee its execution.

Turning Point

The adoption of Pica's minicomputer proposal marked a turning point in the evolution of Hutton's computing facilities and helped catapult the former cost analyst into his current position as vice-president of the company's management information systems (MIS) operations.

Today, at the age of 27, Pica already heads two parts of the three-level systems hierarchy that constitutes Hutton's in-house computing department. The hierarchy's top level is managed by one of Pica's peers, the firm's vice-president of DP operations, and uses three IBM mainframes — two 3033Ns and a 370/158AP — to perform most of the company's standard accounting functions and similar applications.

The other two levels are headed by Pica himself and draw their support from Wang Laboratories, Inc. VS100- and 2200VP-based systems. One of the levels under Pica's control performs all of Hutton's office automation, electronic mail, word processing and selected back office functions with the help of a VS100 configuration.

The other level acts as a kind of in-house time-sharing service and is built around a series of 2200VPs whose operating systems have been extended to allow the processors to work in concert.

Together, the VS100- and 2200VP-based levels form the backbone of Hutton's MIS operations department, which came into being as a direct result of the former cost analyst's minicomputer implementation plan.

The formation of Hutton's MIS operations group reflects the company's — and Pica's — guiding philosophy of continually trying to streamline internal corporate activities and trim costs whenever possible.

"No matter how profitable we are, I say there's always some place where we can be more efficient or save one more dollar through the use of automation," Pica said. "That personal philosophy happily coincides with the company's own. On that point, the firm and I are simpatico."

Hutton's emphasis on boosting its efficiency and cutting its costs stems from management's keen desire to minimize future personnel increases in the face of the company's rapid financial growth, which has recently averaged at least 25% yearly.

In practice, the firm's philosophy of ever-increasing efficiency and economy has manifested itself in a nearly uninterrupted stream of new automation projects that have brought computing power to a wide variety of formerly manual administrative tasks.

In the back office, for example, "we're striving to automate every function that can be routinized, and we're starting with jobs that promise the greatest potential for savings," Pica explained. "Our unofficial motto is, 'If it doesn't require discretion, it ought to be computerized.' "

Another example of Hutton's passion for automation is the company's rapidly growing commitment to word processing. "For some time now, we've been experimenting with word processing in our corporate headquarters, and thus far, we've been very impressed with the results," Pica said. "Now, we're in the process of trying to disseminate the technology even further, first to our 10 regional centers and then to our 300 or so branch offices."

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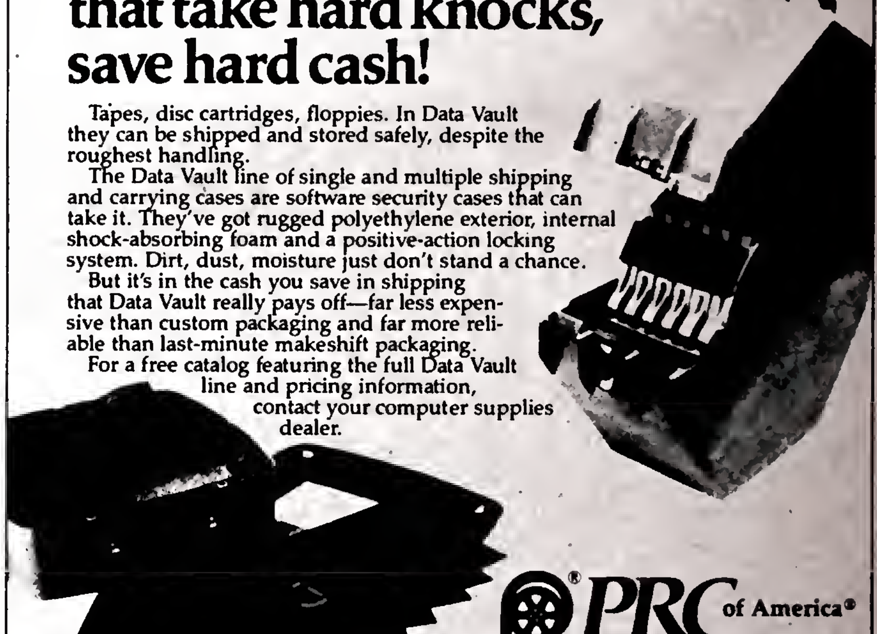

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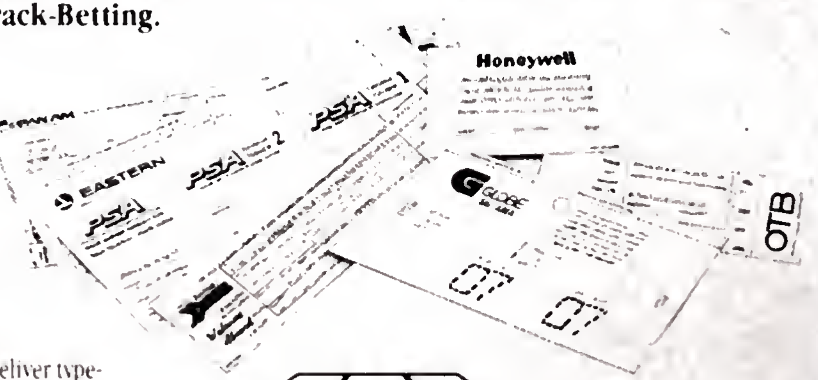

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N.Y. Audit Finds Hospital DP Services Faulty

By Bob Johnson
CW New York Bureau

NEW YORK — Unused reports, spending for outside computer services and a deficient payroll system were among some of the findings of a New York State audit of city-run hospital computers.

The audit, prepared by State Comptroller Edward V. Regan and released here recently, reviewed the operations of the New York City Health and Hospital Corp.'s (HHC) systems and development operations unit and its users. This unit operates HCC's computer center and provides DP services to HCC's central office and various hospitals.

According to the report, 78,200 copies of more than 300 reports were produced by HHC in fiscal 1979 and 1980 and over 18% of the users surveyed said that they were not using those reports and that they were willing to discontinue them.

The report also found that because of the unit's inability to produce many routine reports on time, and all other reports requested, some hospitals resorted to contracting with outside DP firms to provide "essentially the same data as is contained in some of the 300 in-house reports." The audit estimated that hospitals spent about $400,000 a year for these outside services.

The report further cited a special task force that identified "major deficiencies" in the payroll/timekeeping system and uncovered payroll overpayments that totaled $83,600 at the time of the audit. This was in addition to a scrapped project for a new computerized payroll system at the cost of $300,000. The project was stopped after criticism by the Mayor's Office of Operations.

In response to the audit, which on the surface appears to be a slap on the wrist for HCC, Ron Cannon, director of management information systems for HCC, said that it in fact was not.

He explained that although the audit did uncover some problems with HCC's computer operations, the timeliness of the audit had to be considered. He said that the bulk of the audit was done in 1978 and covered a specified period of time. "Some changes have occurred since then and steps have been taken to rectify some of the problems," he said.

Cannon also noted that HCC has installed an entirely new managing body for DP since the audit was done. The new DP unit is now called management information systems and Cannon has only been head of it for seven months.

"We've made changes in the last seven months which would normally take three years. Ninety percent of what was in the state audit no longer exists," he said. "We have saved an immense amount of money changing hardware alone."

A DP director at one of HCC's member hospitals said that the audit did not refer to individual hospital computer operations but to HCC's central DP facility. It was also revealed that the corporation as a whole is currently planning to take care of some problems and has a project team now contracting with outside vendors.

Explaining his views on auditing DP shops in general as well as referring to the state's audit, Cannon said that when a review of a DP facility is done, especially when listings are involved, DP departments do not always control the time it takes for a report to reach a user.

"The procedure of distribution is the important thing. If procedures are not correct then a time problem will occur," he said. He stressed that it is up to each data center to check on its method of delivering reports.

The central computer facility at HCC now has an IBM 3032 CPU and is planning to upgrade to an IBM 3033 and a 4341, Cannon said.

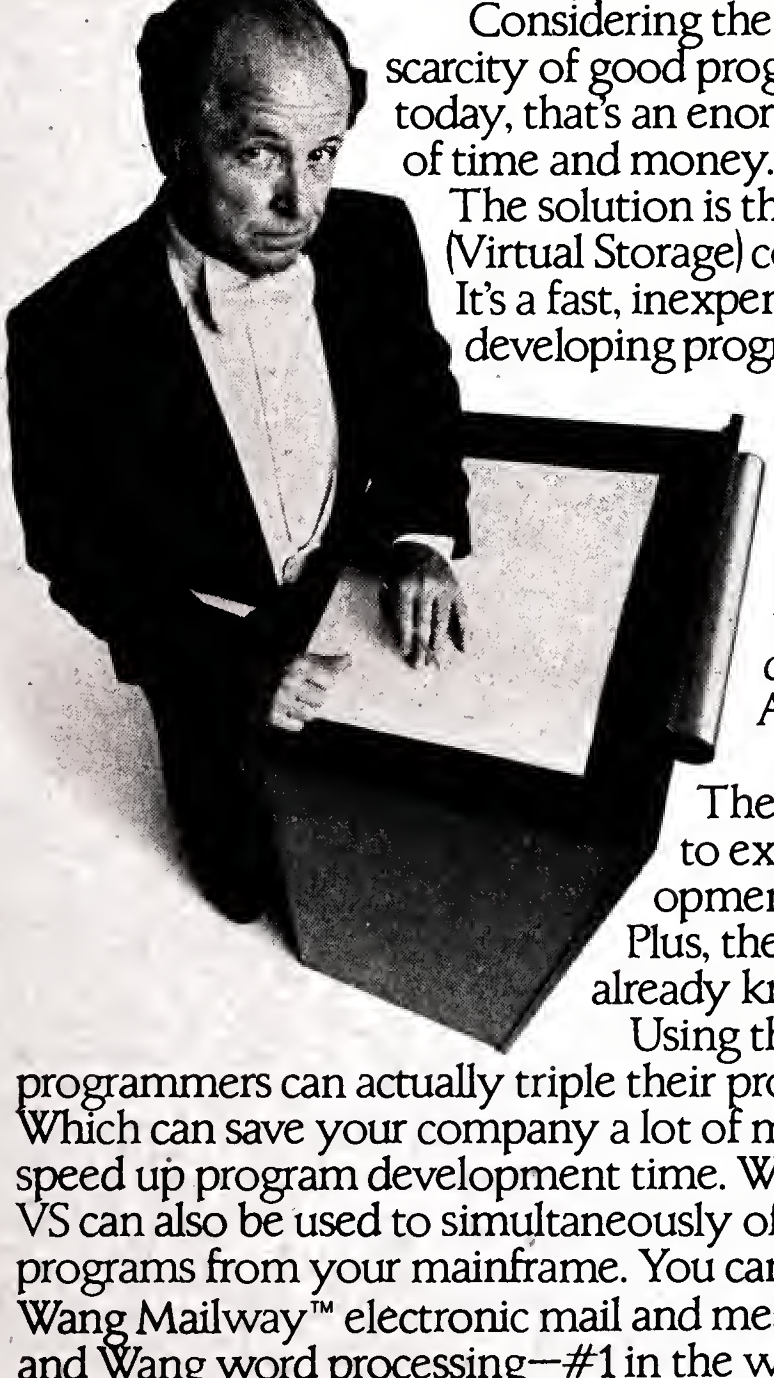
Foes of Contract Win Lawsuit

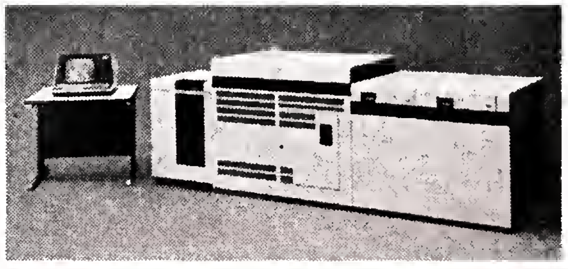
WASHINGTON, D.C. — A group of small businessmen who fought the awarding of a $17 million federal contract for computerized matching of flood zones and were sued after it was canceled won their suit recently. Bruce Feldman of the Cleveland-based firm Record Data International and former federal insurance administrator George K. Bernstein spent two years attempting to block the contract to Chicago Aerial Survey, Inc. of Silver Springs, Md. They said they already provided the services involved and described the government program as "wasteful, needless governmental spending" [CW, July 20].

When the contract was canceled in February, they seemed to have won a victory. However, they were soon sued for "interference with prospective economic advantage" by American Appraisal Associates, Inc., the parent company of Chicago Aerial Survey.

The suit involved not less than $7 million against each of the three defendants, with punitive damages of $14 million, the District Court clerk's office had explained.

The U.S. District Court transcript indicated that "summary judgment is hereby entered herein in favor of all defendants . . . and against plaintiff . . . plaintiff is to bear all costs."





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Poll Finds DP Expertise Top Need for Managers

By Brad Schultz
CW New York Bureau

Technical expertise is more critical to the job of DP manager than is managerial expertise, but the latter is more important for DP managers in large organizations than for those in small organizations.

DP managers gave *Computerworld* that consensus in the third telephone survey of the series [CW, Aug. 17] and, in a poll on vendor relations [CW, Sept. 7], described occasions where technical expertise is imperative.

In dealing with vendors, the DP manager must know more than a product's price and alleged performance parameters. He must know the experiences other DP managers have had with the product and the product's design limitations, the vendor relations poll indicated.

Lack of Understanding

That means the DP manager should be generally well-grounded in the technology behind the product. In conjunction with the DP managers' survey on vendor relations, CW learned from a marketing manager for a software company that users sometimes want software packages modified in ways that would defeat their purpose.

But the polled DP managers complained that vendor salesmen too frequently fail to understand the technology behind their products. DP professionals want straight talk and more technical savvy from vendor representatives.

They are tired of wading through a pile of marketing literature in order to grasp what a device, software package or service really does.

Staff Morale

CW's second poll of DP managers concerned an area where managerial experience is crucial to the DP manager: staff morale [CW, Aug. 10]. The morale needs of junior DPers differ somewhat from those of senior DPers, the poll indicated.

Entry-level programmer/analysts reportedly want challenging work with systems that seem important. In the first CW poll, on shortages in the DP job market, one DP manager named two kinds of professionals at that level, fresh from a university or college.

There are "mechanics," he said, who have a deeper understanding of a system and what future systems could be designed to do, and there are "race-car drivers," who simply want to get the most out of the system at hand [CW, Aug. 3]. That DP manager said he preferred to hire race-car drivers.

In contrast to what boosts the morale of junior DPers, the factors said to raise spirits among senior DPers were assurance of career growth ahead, recognition for jobs well done and smooth relations with user departments.

In the area of managerial problems, DP managers also grapple with strategies for paying DP professionals. Fifteen DP managers disagreed on whether DP salaries should be pegged to an individual or to a job description [CW, Sept. 14].

As various corners of information technology advance, DP managers will need to decide what to call new categories of technical professionals, how to judge their value and how people in one category may shift to another category.

In years to come, DP managers may have to convince top management that, for example, the value of a certain sort of data base expert can rise exponentially, while a certain sort of equipment operator's value can rise just linearly. This would raise the question of how to measure such value and, indeed, whether such value can be measured.

Question of Ethics

Regardless of whether a DPer's value to the organization can be measured, an individual's moral worth seems to defy measurement, another poll suggested [CW, Sept. 21]. The sole exception, in the Boolean sense: either someone is trustworthy or he is not.

In a survey on ethics in the DP profession, a number of DP executives said they did not know how to judge whether a person on their staff could be trusted with sensitive data. At any rate, they agreed that mandatory certification of DP professionals (which would require a DPer to swear commitment to an ethics code) would not improve the moral character of DPers generally.

Finally, CW asked DP managers for views on trade press coverage. The poll indicated that many DP managers consider trade publications biased in reporting on IBM. While most of those who made the charge in CW's poll said the bias was anti-IBM, others said the press was biased pro-IBM [CW, Sept. 28].

But most of the polled DP managers said trade press coverage was rather good.

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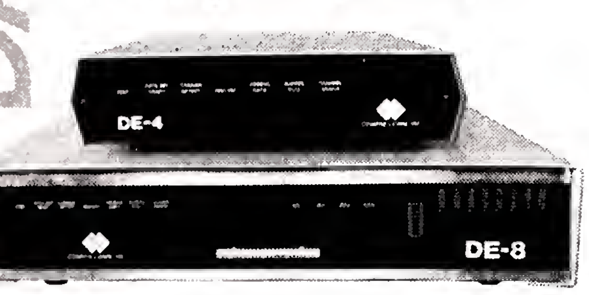

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UN to Set Data Flow Conduct Code

(Continued from Page 17)

to foreign locations, a country's ability to influence the direction of its political, economic and cultural changes.

"In addition, national sovereignty may be impaired if knowledge about the full range of alternatives open to a given country in a given situation is restricted because of lack of access to relevant information or because of an underdeveloped capacity to apply the relevant technologies.

"If a country lacks data about itself and the international system in which it finds itself — because of a very limited capacity to collect, access or process them [data] — it can be said to lack pertinent decision-making capacity about its own future.

"Seen from this angle, an extension of the concept of sovereignty to include 'information sovereignty' is not surprising," the CTC report concluded, adding the present situation "poses a dilemma for developing countries.

"If they make vigorous attempts to be integrated into the international data market, many of them may face the prospect of increased dependence on imported technology and equipment; on the other hand, if they stand aloof, they may have the problems associated with a very limited access to the rapidly expanding pool of machine-readable data."

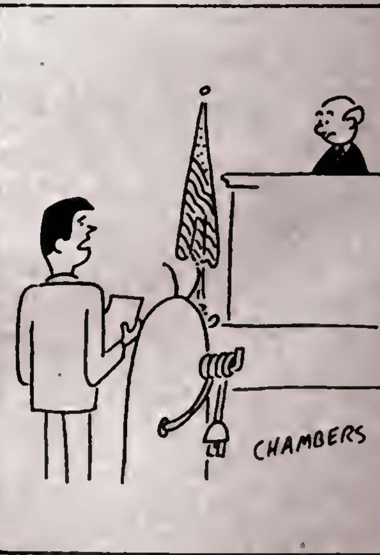
Various Approaches

While not offering any specific proposals to resolve the dilemma, the CTC report noted the approaches of several international organizations, including the OECD and the Council of Europe. It also discussed actions by several countries, including a section on the restrictive practices of Brazil.

Rushing to regulate data flows, the report warned, "may well [result in] a proliferation of a variety of national measures . . . which could obstruct the realization of the positive affects of these flows."

The CTC report concluded with a positive outlook, noting the situation is still fluid and "vested interests are not omnipotent and positions are not frozen. Hence," the report said, "preconditions for a cooperative approach that balances the legitimate claims for national sovereignty and development with the very real need for transborder data flows are still favorable."

Pointing out the developed nations are already discussing data flow in several international bodies that are relatively friendly to multinational corporations, the CTC report suggested "probably the most important question to examine empirically and in detail would be the impact of transborder data flows on developing countries and the role of transnational corporations on it."



'Your Honor, How Can the Defendant Be Charged When He's Not Plugged In?'

Top Brass' Support Required

Survey Uncovers Complexity of Managers' Jobs

By Brad Schultz
CW New York Bureau

On-the-job complexity is transforming the practice of DP management. Recent *Computerworld* telephone surveys found evidence that DP managers need greater support from top management in wrestling with this complexity. The complexity [CW, Aug. 31] reflects the blend of managerial and technical expertise now required of DP executives.

It also reflects the DP manager's increased responsibility for organizational impacts of systems, the nature of perennial staffing problems such as turnover and training and the advent of puzzling new technologies that come to the DP shop from many sources.

Waning Elitism

The typical commercial DP department now works closely with end users, CW found [CW, Aug. 24], who have learned enough DP themselves to melt away technocratic elitism. During the first quarter century of commercial DP, the typical DP department worked without much direct contact with end users and acquired a certain intimidating mystique. No more.

To explore relations between the DP department and end-user departments, CW interviewed 14 DP managers and, at each organization, end-user managers recommended by the DP manager. These 28 interviews did not slant as much in the DP department's favor as might be expected; some DP managers did not hesitate to recommend genuine adversaries for CW to interview. The upshot: DPers and end users have learned how to speak a common language and work shoulder to shoulder.

Further Integration

Some genuine adversaries employed some common language in telling CW why their organizations' DP departments still have much to learn about satisfying end users. But DP managers should expect further integration of DP and end-user activities for the following reasons.

First, end users will know more about computer technology. To take jobs in a company's accounting, general administration, merchandising or sales departments, people will learn the basics of what a computer does and some rudimentary programming skills. These end users may even operate personal computers at home after a hard day at the office. In years to come, America's average professional will know his bits from his bytes.

Second, no one will need to know very much computer technology to operate sophisticated computer equipment, run powerful software and tell the DP department why the software may be inappropriate.

This is because the proliferation of very high-level languages (closer to spoken English than such high-levels as Basic), "unfriendly" and "forgiving" operating systems and other trappings of the turnkey life are taking complexity of execution from the human operator to the circuit board.

Third, the nature of what the DP department automates is passing from the mundane, repetitive functions associated with low-level clerical work to the analytical and inferential functions associated with end-user professionals. As to what MIT professors like to call Decision Support Systems (DSS), end users will have plenty of reason to want contact with the developers. DSS promise big changes in what users do.

A week before the article on end-user relations ran, CW featured three articles on DP education that precipitated a rash of letters from readers. The articles conveyed a consensus view that schools are not adequately preparing people for jobs in DP [CW, Aug. 17].

One reader called some of the polled DP managers "cementheads" for confusing the aim of computer science departments with those of curricula in applied DP. In general, this confusion does seem rampant among DP managers, many of whom attended universities and colleges where computer science departments did not exist at the time.

But educators in computing are well aware of the distinction between a theoretical and experimental science and the study of how to apply a technology. A movement has begun to divorce computer science from DP programs in academic institutions.

Lisp writers will continue to knock on the doors of Cobol shops.

How the Surveys Were Done

Each of the nine *Computerworld* issues in August and September carried one to three articles that described survey results on a particular topic related to DP management. Each article appeared in the week after interviews for it were conducted.

A total of 148 interviews were done — mostly with DP managers in all states of the U.S. For each article, all respondents in a category (such as DP manager or user manager) were asked the same questions, about five in number, and invited to expand on their initial answers.

In selecting DP managers for interviews, CW tried for what seemed a reasonable cross-section on the basis of geographic location, size and nature of DP facility, the total organization's nature (especially the industry served) and systems vendor affiliation.

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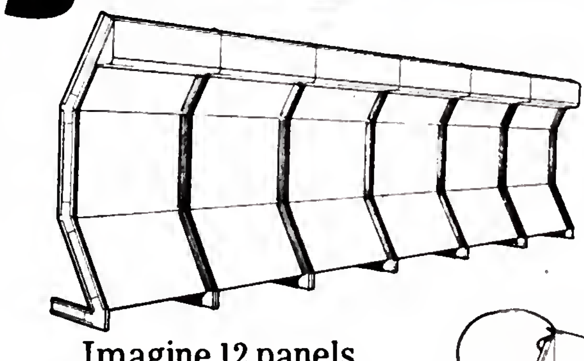

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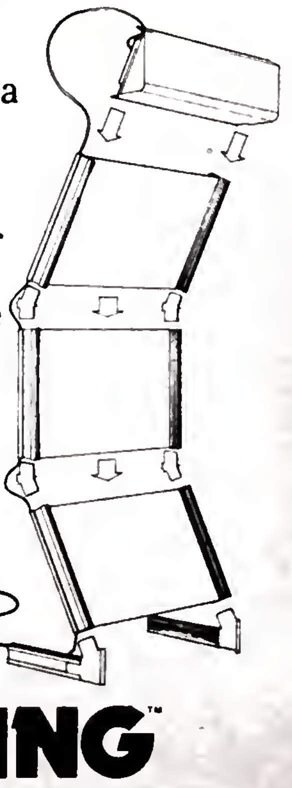

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DPer's 'Technical' Image Changing for Better

By Bob Johnson
CW New York Bureau

The image of the professional DPer is changing — for the better.

The stereotypical "technical type" — pens stuffed in pockets, printer ink on hands — is quickly becoming a person of the past, at least in metropolitan New York. DPers are seeking a new identity, one they feel fits the importance of their profession and the salary levels that they now command.

It is not uncommon for a DP professional in his early 20s to be earning an annual salary of more than $30,000, much higher on average than in other industries. For instance, a vice-president of DP for a major New York bank is only 21 years old; he credits his fast rise to the top to his knowledge of the computer field.

Analysis

Such success stories and the continued growth of the industry are attracting more young people and students to the field. The DP profession, once thought of as a field for math whizzes and stodgy scientific types, is now luring career seekers because of the challenge and monetary rewards.

In New York, which is known for being at the forefront of many social changes, DPers cross every ethnic and educational line and are admired by those in less interesting jobs.

The computer market here appears to be becoming more socially oriented. A local DP executive recruiting firm holds regular parties at popular discos to bring companies and workers together. Computer clubs have sprung up offering members with common interests a place to meet, talk shop or simply socialize.

Computer Consultants

Nowhere is the myth of the boring computer professional more clearly shattered than in the world of the computer consultant. Whether in programming, operations or management, the consultant is the maverick of the new DP breed. Consultants with international assignments earn high wages and have considerable time to themselves.

Large corporations are discovering that the computer person is a valuable commodity not only for his technical knowledge, but also because his expertise can be applied to almost any industry. Companies that are not comfortable with the new technology are giving their computer experts a lot more money, freedom and sometimes power, so as not to fall behind the technology. DPers have realized this and are demanding more from the companies they work for — and they are getting it.

Powerful Position

As recent surveys and analyses have hinted, the management information systems person and computer executive of the near future will hold a powerful position in the corporate hierarchy. DPers know this and are commanding respect from their corporate peers.

For the bright and ambitious, DP is offering a fairly quick route up the corporate ladder. Because technical knowledge is valued more than academic credentials, the DP pro does not feel neglected by any lack of formal education. Management positions are available if the technical expertise is there.

The challenge of the work, the good salaries, the independence, the potential for success and bright job opportunities have combined to change the professional DPer's image. He is becoming one of the most desired workers of the future — quite different from the number genius of the not-so-distant past.

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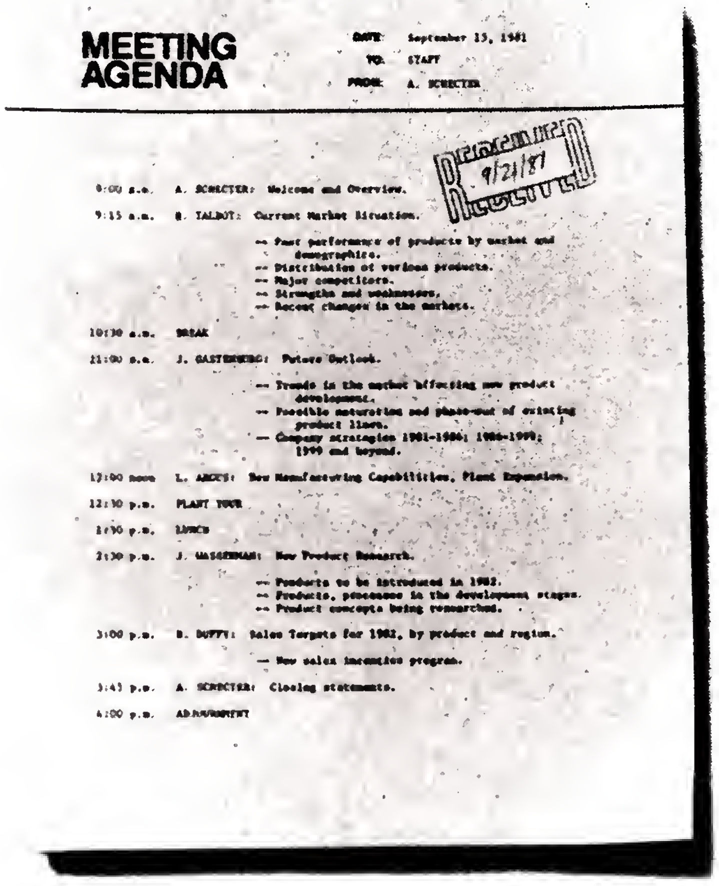
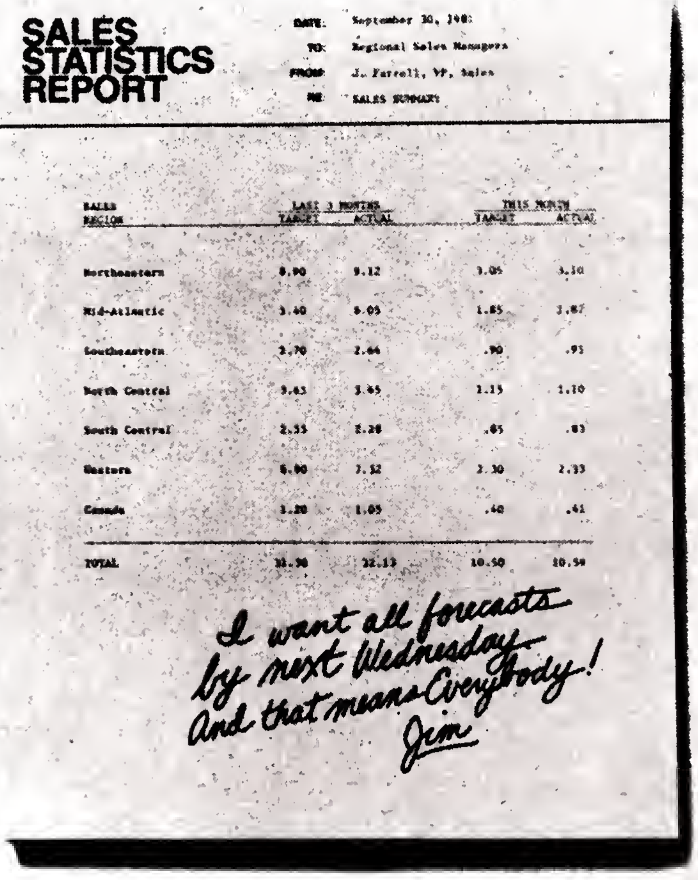


MEETING AGENDA

DATE: September 15, 1981
TO: STAFF
FROM: A. SCHECTER

RECEIVED 9/21/81



SALES STATISTICS REPORT

DATE: September 30, 1981
TO: Regional Sales Managers
FROM: J. Farrell, VP, Sales
RE: SALES SUMMARY

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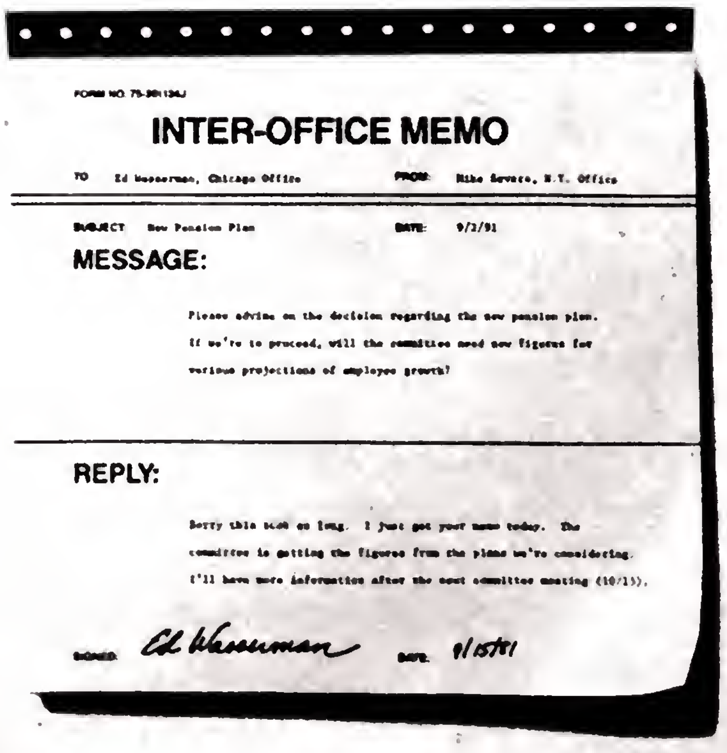
Jim



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TO Ed Wasserman, Chicago Office
FROM Mike Severo, N.Y. Office
SUBJECT New Pension Plan
DATE 9/2/81

MESSAGE:

Please advise on the decision regarding the new pension plan. If we're to proceed, will the committee need new figures for various projections of employee growth?

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Signed: Ed Wasserman
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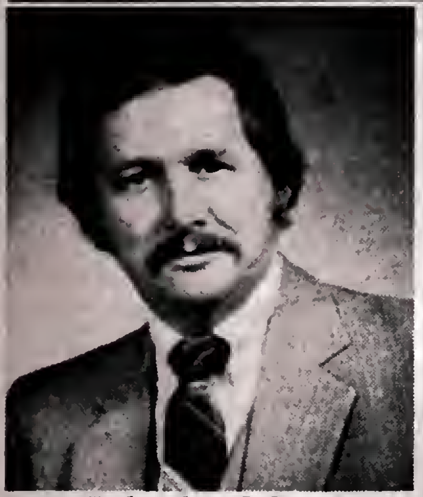
Roland R. Johnson

William R. DePouw

Dennis M. Klinger

Douglas K. Jackson

Carter R. Farnsworth

Managers on the Move

ROLAND R. JOHNSON has been appointed manager of computer technology for Fruehauf Corp. in Detroit.

Johnson joined the company in 1972 and most recently served as the manager of systems development in the information systems department at the corporation's subisidary, Kelsey-Hayes Co. He will now be responsible for the operation and technical support of Fruehauf's corporate data center and special management information systems projects.

Johnson attended the University of Michigan at Dearborn and Wayne State University.

•••

WILLIAM R. DePOUW was recently named vice-president of management information systems at United Steel and Wire Co., a division of Roblin Industries, based in Battle Creek, Mich.

The former manager of data processing and systems will now be in charge of the expansion and use of computer services to all facets of management. Prior to joining United Steel, DePouw was with Wolverine Insurance Co. and Federal Life and Casualty as programming manager.

DePouw attended New York University and is a member of the Data Processing Management Association, for which he served as chapter president in 1967.

•••

DENNIS M. KLINGER has been elected division vice-president of management information systems (MIS) at Ryder Truck Rental of Ryder System, Inc. and is based in Miami.

Klinger has more than 14 years experience in computer and information technology and in business systems and planning. After joining Ryder in 1977, Klinger moved consecutively from manager of technical administration and planning to director of that function, then to director of systems and programing and most recently to group director of MIS.

Klinger attended Miami-Dade Community College and studied business systems at Florida Atlantic University, where he earned a B.S. He earned an M.B.A. degree from Florida International University.

•••

DOUGLAS K. JACKSON has filled the newly created position of director of management information systems at the Linclay Corp., a St. Louis commercial real estate development firm.

Jackson is now responsible for directing and expanding the company's information systems staff, including DP operations and telecommunications. He brings to the post a decade of experience, having worked as systems and programming manager, DP manager and then director of information services at LaSalle Partners, Inc. of Chicago.

Jackson holds a B.S. degree in business management from Purdue University and has done graduate work at Northwestern University.

•••

CARTER R. FARNSWORTH has been appointed vice-president, control and administration for the information technology group of Indian Head, Inc. of New York.

In this newly created position, Farnsworth will be responsible for coordinating financial planning, control and administrative functions of the information technology group. The group is made up of Bibliographic Retrieval Services, Capitol Services, Inc., Information Handling Services, Predicasts, Inc., Seibt-Verlag GmbH, Technical Indexes Pty. Ltd. and Technical Indexes, Ltd.

Farnsworth joined Indian Head in 1970 as vice-president and controller for two divisions. He is a graduate of Ohio State University with a B.S. in business administration.

•••

RON SUTTON has been named vice-president, data services, for Murry's Steaks, Inc. of Forestville, Md.

Sutton came to Murry's in 1976 and began developing on-line systems through distributive processing. His new position oversees the programming, systems and operations division.

A graduate of Kansas State University, Sutton is a member of the American Management Association, Institution of Management Sciences and the National Association for the Advancement of Science. He has also published on data processing and has lectured on inventory control and management at George Washington University.

•••

DONALD L. BOYD has been named director of the computer sciences center at Honeywell, Inc.'s Corporate Technology Center in Minneapolis.

Since March, Boyd was manager of computer sciences research. He joined Honeywell in 1976 as a research scientist in the Corporate Technology Center and was promoted to manager of computer systems in 1979.

(Continued on Page 26)

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Consultant: Execs Need Help Against DP Crime

By Bill Laberis
CW Staff

WASHINGTON, D.C. — Management is going to need all the help it can muster to fight the growing opportunities to steal both with and from computer systems.

But it is indeed rare to find individuals with the multiplicity of skills necessary to do a good job of computer crime investigation, security consultant Bruce Goldstein said.

Goldstein chaired a computer crime workshop sponsored here last month by Assets Protection of San Francisco.

Tougher and more definitive state and federal laws pertaining to computer crime and abuse are needed to reinforce in-house efforts to stop their spread, workshop leaders said.

Recently, however, the Reagan administration announced plans to cut back on the funding of white-collar-crime specialists attached to the U.S. Department of Justice.

Independent Development

Workshop leaders, therefore, stressed the importance of DP shops developing optimal system security measures on their own, bearing in mind the acute dearth of legal precedents in the computer crime area and the extreme difficulties in prosecuting computer criminals.

Computer crime and abuse is "really not much of a problem at all" at the Maryland National Bank in Baltimore, according to workshop attendee James E. Kopp.

Kopp, the bank's DP group manager for the last five years, claimed his department has investigated only one instance, a minor one, in which an employee attempted a computer theft. The scam was discovered before any damage was done, he said.

Kopp attributed the bank's success in preventing computer crime to a combination of internal audit controls and personnel management considerations. In addition, bank management is sympathetic to the security department's needs, he said.

For one thing, Kopp's audit group employs former Baltimore policemen and detectives whose proven investigative skills the bank has augmented with some DP and audit training.

The bank also leases an MSA Corp. personnel package that routinely calls up employees vitae for review and updating. This, Kopp said, is part of a longer range program to maintain employee morale by trying to ensure qualified employees do not languish in low-level positions.

In addition, the bank recently purchased a comprehensive audit software package designed to establish guideposts along the DP audit trail.

"We learn from what goes on around us all the time," he said. "After Wells Fargo [a computer-assisted $21.3 million bank embezzlement, CW, March 9] we did our own internal audit of wire transfers, just to be on the safe side."

That top management does in fact appear to be growing more sensitive to computer security demands was noted by Sheryl Teed, manager of computer audit at the accounting firm of Clarkson Gordon in Toronto.

"I think the Canadian experience on the incidence of computer-related crime is based on what we've observed in the United States, which is that computer crime is not to be taken lightly," she said.

Canadian corporate management is becoming more willing to heed both auditor and management information systems manager cost justifications for audit software and tighter system controls in general, she said.

Major Robert Schlansker of the U.S. Air Force Office of Special Investigation said the need for more accurate historical data on computer crime and abuse is as pressing in the federal area as in the private sector..

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American Society for Information Science
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Management Warned to Face It

Job Frustration Seen Incubator for DP Crime

By Bill Laberis
CW Staff

WASHINGTON, D.C. — Computer crime can be dealt with effectively only when management stops treating it as a one-dimensional evil.

"The hard data — and there's very little of it — shows job-related frustrations are more often the motivation for computer crime than any string of personality characteristics," said Jack Bologna, speaking here recently at a computer crime workshop sponsored by Assets Protection of San Francisco.

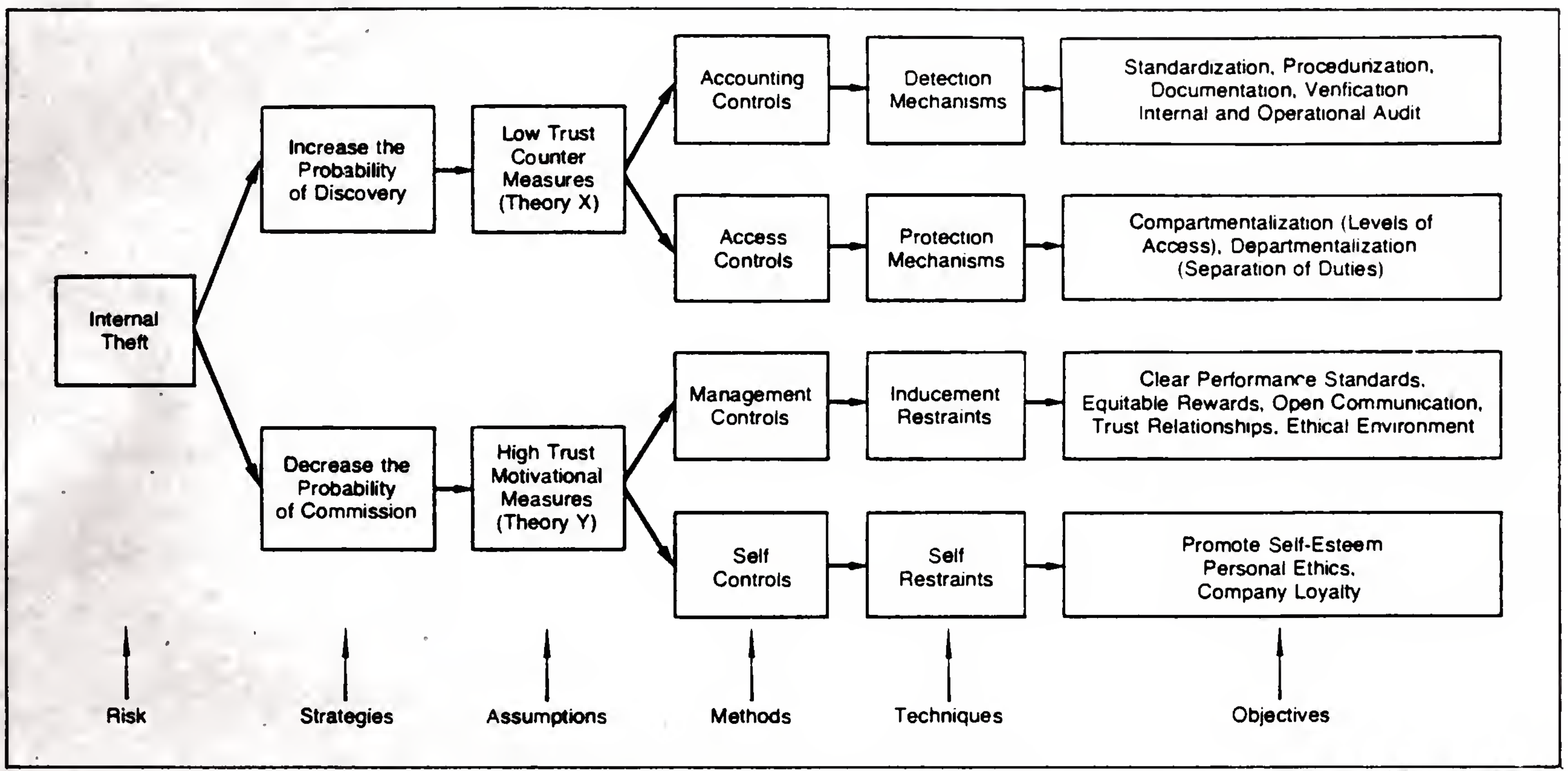
"Therefore, the first question management and investigators must address is whether employees are disgruntled and, if so, why," he added. "Bear in mind that, no matter how tight the internal controls, any computer system can be defeated. Believe me, they all have their loopholes."

Bologna told the workshop group of auditors, investigators and DPers that the increasingly voluminous store of data on computer crime is laden with theft-motivation theory. Most of it is unsupported and undocumented by anything more than anecdotal data or individual biases.

The theories paint the typical computer criminal as a young white, well-educated male who is ambitious, more intelligent than his peers and largely unable to communicate with non-DPers.

But it is time to rethink old theories, according to Bologna, who said he believes they should be reshaped with a heavy dose of human factor engineering.

Bologna holds degrees in law and accounting and spent 14 years as an investigator for the U.S. Internal Revenue Service, including a stint as an undercover agent. Today, as president of George Odiorne Associates, Inc., a management consulting firm based in Plymouth, Mich., he lives in a world of "salami slicing," "trap doors" and "superzapping" — investigative trade names for various computer scams.



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Courtesy George Odiorne Associates, Inc.

An Internal Theft Prevention System

Trend Developing

DP managers must come to view computer crime as the rapidly growing specter it is or face the possible dire consequences of a large-scale rip-off that is very hard to detect, let alone solve. Available evidence shows the number of computer-related crimes increasing geometrically, with many reasons to suspect the trend to continue, he said.

The trend has followed the evolution of data processing from the days of batch processing and off-line operations in the '50s to the DP shop today, characterized by greater system access, simpler programming languages and the proliferation of distributed data processing.

"Unfortunately, we have observed a parallel trend serving to make the computer crime risk even worse, that is, DP managers who are either unaware of the potential dangers or who are too busy to care. Their attitude seems to be one of, 'Let's get the system working and worry about things like security and theft later,' " Bologna said.

For managers who do care about theft and data pilferage or the non-business-related usage of CPU time, Bologna suggested taking the first step in preventing crime on-site, namely, performing a "classic audit checklist" and hiring an outsider to do so if the system is particularly complicated.

The audit should ensure that the system provides for adequate separation of duties among DPers, up-to-date job descriptions and an organizational chart that delineates functions and hierarchical levels of authority in a company or DP department.

"Classic auditing is intended to uncover deviations and variances from accounting standards of acceptable practice," he said. "But where pretense is used to disguise a transaction or cover it up, the auditor is not likely to become suspicious. Things are in balance, so to speak. And when things are in balance, no one gets concerned."

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DPMA Meet to Feature Educational Seminars

SAN FRANCISCO — A variety of educational seminars specifically designed for the information manager will highlight the Data Processing Management Association's (DPMA) 30th international conference and business exposition here next month. The conference is scheduled for Nov. 1-4.

The educational seminars will cover five basic areas: general management, personal growth, technical management, trends and directions and operations management, according to a DPMA spokesman. Session subjects will range from increasing management, time management and nonverbal communication to management burnout. Other subjects that will be tackled include interconnecting technologies, managing word processing and systems performance evaluation.

In addition to the seminars, the DPMA will hold three additional workshops that cover software quality assurance, communications styles and persuasive influencing techniques. Speakers for all the sessions will include industry leaders, private consultants, management experts and academic researchers, the spokesman noted.

At the same time as the conference, the organization's business exposition will include equipment displayed by some 90 vendors, as well as an historical display commemorating the 30 years of the DPMA and computer history. Among the companies taking part in the show will be Wang Laboratories, Inc., 3M Corp., Tandy Corp., Datapoint Corp., IBM and Hewlett-Packard Co.

Registration fees for the conference and exposition, including the awards breakfast, banquet and three luncheons, are $320 for DPMA members and $370 for nonmembers. The fees for the conference and exposition, but not including the luncheons, are $270 for members and $320 for nonmembers.

Special one-day conference passes are available for $130 for members and $150 for nonmembers, while daily student passes are priced at $20 and $30 for members and nonmembers, respectively. Finally, the half-day and all-day workshops range in price from $55 to $75 for members and $60 to $80 for nonmembers.

Additional information is available from the DPMA at 505 Busse Highway, Park Ridge, Ill. 60068.

Managers On the Move

(Continued from Page 23)

Boyd holds a doctorate in computer science from the University of Iowa and worked as assistant professor of computer science at the Unviersity of Minnesota for five years before joining Honeywell.

•••

DAVID W. DANDRO has been appointed corporate director of data processing for Emhart Corp. in Farmington, Conn.

In his new post, Dandro will oversee a DP network of 66 computer sites in the U.S. and 19 foreign countries. Dandro was formerly with Borg Warner Corp. of Chicago, where he served as corporate director of management information systems.

In addition to a B.S. degree in mechanical engineering from Montana State University, Dandro holds an M.B.A. from the University of Chicago.

•••

ROBERT A. HOKOM has accepted the position of vice-president and management information systems section head in the S/MIS Department at the First National Bank of Chicago.

Hokom was previously employed by the First National Bank of New Jersey, Chase Manhattan Bank, Aerospace Corp. and North American Rockwell, where he successively carried out a broad range of technical and systems planning and implementation responsibilities.

He holds a degree in mathematics from the University of Southern California and has served in the U.S. Marine Corps.

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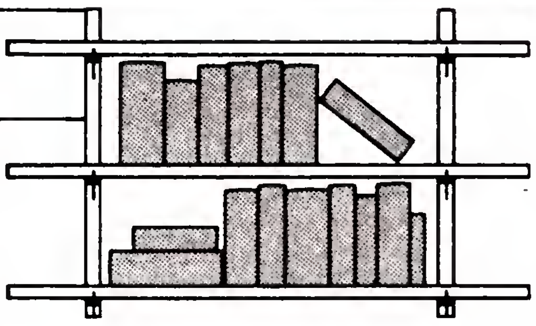

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By Nigel Hawkes

This handsomely designed collector's volume records technological ingenuity through the ages. Hawkes, author of *The Computer Revolution* and science correspondent for the London *Observer*, describes 73 instruments, including Galileo's pendulum, Sauter's calculating machine and Troncet's arithmographe. All 73 devices, photographed by Michael Holford, are shown in full-color reproductions, including two fold-out flaps. Extra-large pages (approximately 9 in. by 12 in.), high-quality stock and an elegant typeface highlight the brief but informative descriptions.

Includes an introductory overview by D.J. Bryden, curator of the Whipple Museum of the History of Science, University of Cambridge, England.

Hardcover, 164 pages, $29.95. Abbeville Press, Inc., 505 Park Ave., New York, N.Y. 10022.

GRAPHIC COMMUNICATION '80s

By Edward M. Gottschall

Interprets the flood of new technology in publishing, advertising and printing in an up-to-date source book. Adapted from "Vision '80s," featured in the June 1980 edition of *Upper and Lower Case*, the report has been updated, its glossary expanded and the tabloid size replaced by an 8½-in. by 11-in. format. Provides a primer in word processors, photocomposition machines, intelligent copiers, telecommunications systems and other electronic tools for artists, writers, designers, WP operators and managers, typesetters and anyone pursuing a career in graphics communications.

Written by the director of information and marketing services at International Typeface Corp. and consulting editor for the *Graphic Arts Manual*. Provides a complete equipment selection checklist. Suitable for nontechnical readers.

Hardcover, 240 pages, $19.95. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

This monthly column describes a variety of recently published books of interest to Computerworld *readers. The books can be purchased or ordered at most bookstores; CW does not sell books.*

All inquiries for further information about the books should be directed to the publishers.

Publishers that wish to have their books considered for review can direct press releases, catalogs or other information to Features Editor, Computerworld, *P.O. Box 880, Framingham, Mass. 01701. CW cannot be responsible for unsolicited books.*

LOGICAL CONSTRUCTION OF SYSTEMS

By Jean-Dominique Warnier

The renowned author of *Logical Construction of Programs* provides a comprehensive and practical guide to system design that may be adapted to any computer system. Applies the logic method to define the data of a system, with numerous practical examples. A concise, step-by-step approach designed for "old-timers as well as beginners," the book provides technical solutions to system design problems that do not require modification of the logical organization of data. This is a procedure that promises to be widely used.

Hardcover, 179 pages, $22.95. Van Nostrand Reinhold, 135 W. 50 St., New York, N.Y. 10020.

MICROPROCESSOR OPERATING SYSTEMS

Edited by John Zarrella

Describes nine of the most important microprocessor operating systems now available. Each chapter is written by an industry leader involved in the development or implementation of the operating system. Included are National Semiconductor Corp.'s BLMX-80, Intel Corp.'s iRMX 80/88 and iRMX 86, Data General Corp.'s MP/OS, Zilog, Inc.'s RIO/CP and ZRTS, Texas Instruments, Inc.'s Rx, Bell Laboratories' Unix (implemented by Plexus Computers) and Motorola, Inc.'s Versados. Written for people who use, select, evaluate and/or design microprocessor systems.

Paperback, 168 pages, $11.95. Microcomputer Applications, P.O. Box E, Suisun City, Calif. 94585.

UP THE EDP PYRAMID: The Complete Job-Hunting Manual for Computer Professionals

By Jack French

The author, with 25 years' experience in DP management, has held most of the positions he describes in this book and offers first-hand advice on how to evaluate companies and opportunities, how to avoid career traps and how to achieve and maintain a challenging position. Introduces resume formats for various data processing jobs and describes the personality types and aptitudes most suited to the computing field and the kind of motivation needed to accelerate.

Several useful appendices include a list of DP organizations, software suppliers by package type, data communications carriers, computer service companies, personnel services and hardware vendors.

Hardcover, 185 pages, $19.95. Wiley-Interscience, a division of John Wiley & Sons, 605 Third Ave., New York, N.Y. 10158.

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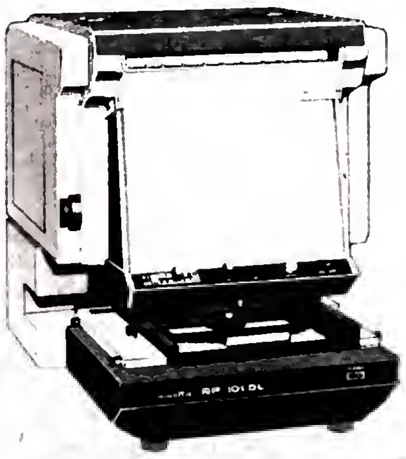

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Canadians Dispute DP's Role of Job Destroyer

By Bill Laberis
CW Staff

OTTAWA, Ont. — The doomsday soothsayers who claim proliferation of computer technology will lead to widespread unemployment "appear more and more as crystal ball gazers and less and less as professional analysts."

Further, the overall employment effects of computers and computer-related electronic systems have generally been positive, with most negative effects more than offset by DP-stimulated employment gains elsewhere in the economy.

These are some of the conclusions reached as a result of a 13-month study to determine the employment effects of computers and telecommunications technology in Canada.

Findings of the report, funded by the Canadian Department of Communications, were based on statistics gathered from a cross-section of economic activities, including banking, electrical manufacturing, insurance, transportation and telecommunications, as well as on information from an academic institution.

S.G. Peitchinis, author of the report and economics professor at the University of Calgary, argued that the cases he studied showed past predictions of extensive widespread unemployment have been based on three assumptions, none of which is sustained by his work.

The first assumption is that the availability of computer technology is of itself a sufficient condition for the widespread application of the technology.

However, there are a number of factors contributing to a relatively slow rate of implementation of the technology, including the availability of efficient and effective support services, according to the report.

"Computer technology . . . is still in the developmental stage and other forms of electronic technology, such as office automation, are just making their uncertain debut. A new technological infrastructure cannot evolve and sustain itself if its ends are alien to the ends of society," according to Peitchinis.

Justifying Investment

The second assumption held by the doomsday spokesmen is that the rate of implementation of computer technology will accelerate rapidly as hardware prices plummet.

"But to any enterprise, the replacement of one production process with another entails considerable capital investment, which has to be justified in relation to other claimants for the investment funds," Peitchinis said.

Further, in an office setting for example, there is some confusion between the productivity of clerks and typists and the productivity of the office as a whole.

Clerks and typists are not as a rule involved in labor- and time-saving decision making, he said. The information they help process is made available to their bosses faster with DP technology, but this "does not do much in relation to their decision-making processes."

Moreover, the third assumption expects productivity increases resulting from the technology to increase faster than demand for services. Instead, Peitchinis said, the employment effect of computer technology will be determined by what happens on the demand side rather than on the supply side.

Demand for Output

The study contends the industries most rapidly computerizing operations are the same industries whose product and service demands are rising the fastest. Therefore, productivity gains in these areas will be more than offset by increased demand for output, he argued.

"Clerical functions related to the filing and retrieving of information are being eliminated, but functions involving data entry, data control and computer time scheduling are being created," Peitchinis said.

In the Canadian telephone industry, the initial effect of mass computerization has displaced more operators and manual line testers than have been replaced elsewhere to date. This condition is temporary, according to the study, given the anticipated boom in the demand for communications services.

"The reality is that our society, like other technologically advanced industrial societies, has evolved a capacity to diffuse and absorb the bumps of technological change," Peitchinis said. "Prognosticators of gloom and doom have a very narrow view of society."

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DATA COMMUNICATIONS NETWORK COMPONENTS	San Francisco Washington	Oct 14-16 Nov 16-18
NETWORK DESIGN I	Washington San Francisco	Oct 21-23 Nov 4-6
NETWORK MANAGEMENT	New York San Francisco Chicago	Oct 21-23 Nov 4-6 Dec 16-18
CORPORATE NETWORK ARCHITECTURES	San Francisco Washington	Oct 28-30 Nov 4-6
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INTRODUCTION TO INTERNATIONAL TELECOMM.	New York Los Angeles	Oct 7-9 Dec 9-11
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'Computer Mechanics' Needed

Labor Stats: DP Industry to Skyrocket in '80s

By Bill Laberis
CW Staff

WASHINGTON, D.C. — Statistics released late last month from the U.S. Department of Labor (DOL) have confirmed the obvious: The computer industry will boom through the '80s as the most vibrant sector of the economy.

And within the computer industry the most pressing need will not be for programmers or systems analysts, but for computer service technicians — "computer mechanics," as DOL calls them.

By 1990, employment for computer mechanics will increase between 148% and 173%, up to as many as 172,000 jobs from the 1978 level of 63,500, DOL predicted in its Monthly Labor Review for August. The report contains projections of the economy, employment and occupational structure to 1990.

Of the 340 employment categories examined by statisticians, computer-related jobs dominated five of the top six categories expected to grow the fastest over the next decade (see chart).

For example, growth in employment for systems analysts has been pegged between 107% and 123% by 1990, for computer operators 88% to 101% and for computer programmers, 74% to 87%.

By comparison, the average expected growth for all 340 occupational categories is between 23% and 31%, less than a third of the expected growth for combined computer-related occupations.

Overall, computer and peripheral equipment manufacture was cited as the nation's fastest growing industry throughout the '80s. It is expected to grow at an average annual rate in terms of output change (or real growth) of more than 8%; this compares with a predicted growth in all private industries of less than 3%.

"A list of the specific types of equipment for which demand is expected to be greatest reflects the full fruition of the 'age of electronics,' " DOL predicted. "Leading the advance will be the purchase of computers and peripheral equipment."

DOL also predicted a rapidly growing demand for office and communications equipment as well as for scientific and controlling instruments, all of which are "characterized by, or contribute to, rapid advances in technology."

As older machines or production processes become less efficient or even obsolete, businesses are expected to buy more of these high-technology items in relation to other capital goods in order to remain competitive.

Further coloring the computer industry's future with bold, rosy strokes are the government's projections for increases in foreign trade. U.S. imports will represent more than 9% of the gross national product by 1990, the report said.

On the export side, the most interesting to the computer industry, DOL said the traditionally strong U.S. exports — food, aircraft, motor vehicles and chemicals — will be joined en masse by computers and electronic components in the coming years.

Occupation	Percent of Growth In Employment, 1978-1990
Data Processing Machine Mechanics	147.6
Paralegal Personnel	132.4
Computer Systems Analysts	107.8
Computer Operators	87.9
Office Machine and Cash Register Services	80.8
Computer Programmers	73.6

Some DOL Projections

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N.Y.C. Users Laud Performance of IBM 4300s

By Bob Johnson
CW New York Bureau

NEW YORK — IBM has earned an A+ on its 4300 series report card from users in the New York metropolitan area.

A *Computerworld* telephone survey designed to gauge the reactions of a dozen 4300 users here found that the company's 4331 and 4341 models measured up to expectations.

All survey respondents were from DP shops that have had the new systems installed from eight to 18 months. Most surveyed installations had upgraded from older systems to either the 4331 or 4341 and a marked improvement was noticed. However, some first-time users expressed praise for the 4300s as well.

'Beautiful' Capabilities

Borden, Inc.'s international division, which has housed a 4331 for the last eight months, described its capabilities as "beautiful."

William Wehrheim, management information systems (MIS) director at Borden, said his 4331 is reliable and has lived up to its benchmarks. Wehrheim said Borden switched to the 4331 from Data General Corp. equipment, adding that at first he was reluctant about making the switch but is now happy that he did.

"We are very pleased with the overall performance of the 4331. IBM's support is excellent and as a matter of fact we plan to upgrade to the 4341 with a Model Group 2, which will give us some additional disk capabilities," he said.

Initial Problems

Win Applegate, director of MIS at Belding Hemingway, Inc., upgraded from an IBM 360/30 to an IBM 360/138 to the 4331 and finally to a 4341. Although there were some initial operating system software problems when installing the 4341, the system is "very reliable," Applegate said. He also is planning a Model Group 2 addition to the system.

Productivity appeared to be of paramount importance to 4300 series users. The main reason many of these systems were purchased was to increase throughput and allow for more software options.

Morris Fusco, director of DP at the Publix Shirt Corp., said that since his company upgraded from a 370/135 to the 4341, he has noticed a vast improvement in the processing speed of the new machine.

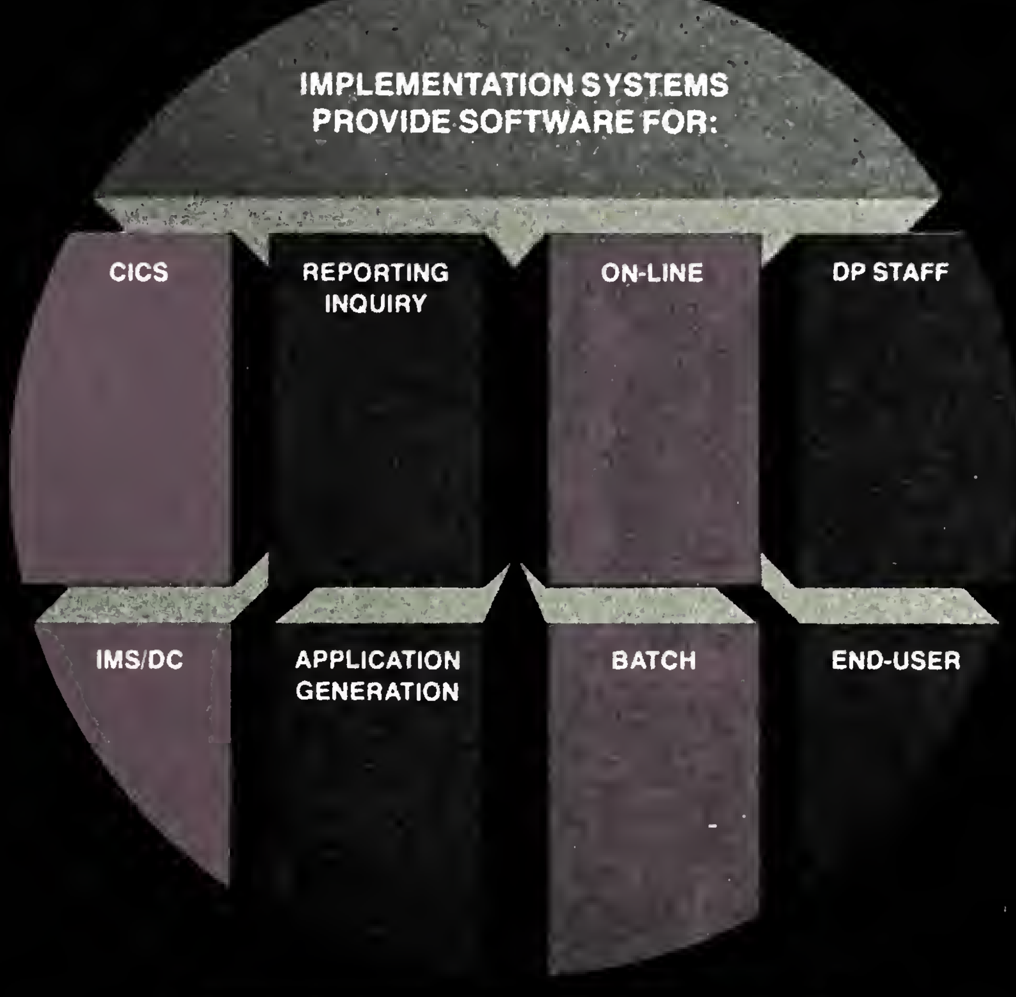
Another area DP manager who described the system as being "A1," said he was "thrilled" with its performance. "We were running a 135 before, but the 4341 has shown vast improvement in our productivity, especially for our on-line system."

Two factors that traditionally plague new computer systems are conversions and new installations. The 4300 series scored well in those areas also.

H. Resnikoff, computer center director at Kingsborough Community College, said that IBM had told him that no conversion would be necessary to switch from his former 360/30 machine and that they were absolutely right. "We've had our 4331 since last September and have not experienced any major problems. IBM has been very supportive," he said.

Bill Fish, DP manager for Century Factors, Inc., a first-time user who formerly used a service bureau, said that he was very happy with the system and the installation went much smoother than he anticipated. "We were either very lucky or the system is really simple to install," he noted.

Perhaps the best place to find out how a system is actually running is on the front lines in the machine room. Dave Barry, computer operations supervisor for Warner Amex Cable Co., commented on the 4300 series from the "front": "I believe we are the first shop where IBM has supported MVS under a 4341 machine and it seems to be working fine," he said. "The hardware is also very small and fits into our machine room nicely. In fact, we've ordered two more," he added.



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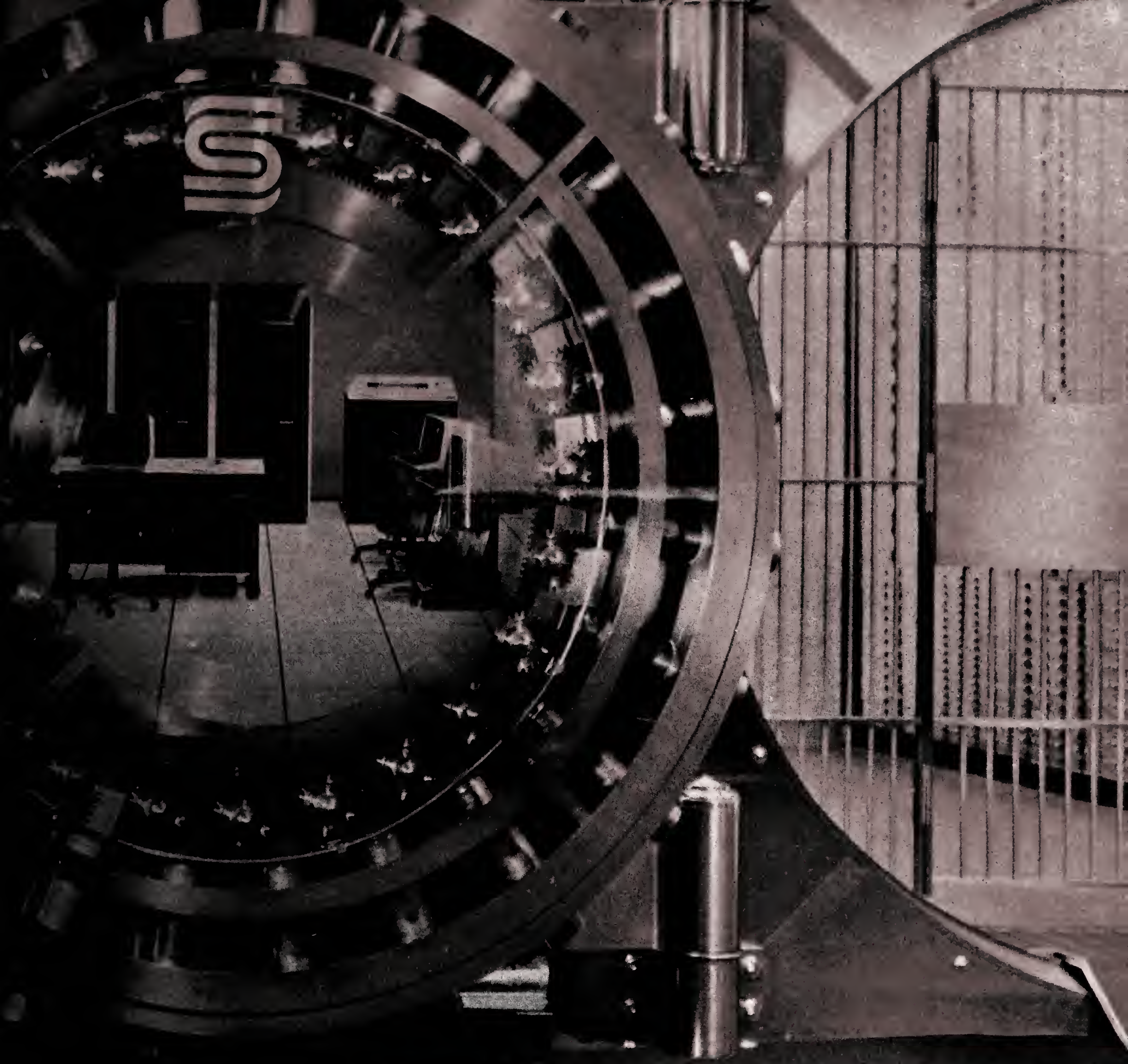

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TANDEM

NonStop Computing Systems

Study Sees European Local Area Nets by '82

By **Bruce Hoard**
CW Staff

NEW YORK — Every major DP, word processing and data communications company in Europe will have at least one local area network product on the market by 1982, according to a recent study conducted by Frost & Sullivan, Inc. here.

In addition, expenditures in Europe on local area network controllers and network management services will increase fivefold, to $90 million, between 1980 and 1990, the study maintained.

Entitled "Local Area Network Technology and Markets in Europe," the study claimed the real importance of a local area network lies not in its own value, but in the value of the work stations and terminals attached to it.

The 246-page report went on to say local area networks define a new market for equipment suppliers and a new architectural approach to office and factory automation for users.

In Europe, Xerox Corp.'s Ethernet local area network is the leading and best known system and the study said it has inspired others such as Unet, Hyperbus, Ner/One, Casenet and Netskil.

The so-called closed local area network is based on proprietary protocols, it said. These include Datapoint Corp.'s Arc system, the Apollo computer network structure of interconnecting microcomputers, Xinet, Wangnet and others, which are classified as "bundled networks."

About mid-decade, such proprietary networks will begin to become obsolete, the study asserted, saying "Users will encounter disadvantages with those networks that employ only the products of a single supplier."

All local area networks, whether open or closed, will face increasing competition from yet another source that performs the same functions — namely, the third generation private automated branch exchange.

The computer-based machine employs twisted wire pairs, with each pair carrying 128K bit/sec of data, the study explained.

Half the capacity can be used to transmit voice, leaving 56K bit/sec of capacity for data transmission and the remaining 8K bit/sec for signaling.

The 246-page report number E464 costs $1,400 from Frost & Sullivan at 106 Fulton St., New York, N.Y. 10038.

Reference Service Suggests Ways To Protect DP

PENNSAUKEN, N.J. — Auerbach Publishers, Inc. has introduced a bimonthly reference service called "Data Security Management" designed to help organizations protect their data resources against computer crime, sabotage and natural disaster.

Major topics to be covered in the periodically updated reference include managing the data security function, disaster recovery planning, risk analysis, insurance, encryption and combating computer crime.

The reference service will also include reports on current data security management techniques, security case studies and checklists to help DP professionals monitor their own data security measures.

"Data Security Management" is being offered at an introductory price of $212.50 from Auerbach Data Security Management, 6560 N. Park Drive, Pennsauken, N.J. 08109.

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Report Finds CSMA/CD Best for Bus Local Nets

By Bruce Hoard
CW Staff

FRAMINGHAM, Mass. — When it comes to line access on a bus-based local area network, the carrier sense multiple access with collision detection (CSMA/CD) method is less vulnerable and complex than its chief competitor, token passing.

That conclusion was reached by the Information Systems Planning Service (ISPS) of International Data Corp. (IDC) in a recent report entitled "Local Area Networks."

In a section designated "Key Technologies," the study examined the pros and cons of CSMA/CD and token passing, along with other local area communications technologies. Those other technologies include star networks, private branch exchanges (PBX), coaxial cable vs. fiber optics, bus vs. ring topologies and baseband vs. broadband transmission.

Bus-Based System

As the report explained, with CSMA/CD on a bus-based system, the interface unit for each network node "listens" to determine if another node is transmitting by detecting a carrier signal. If there is none, it transmits.

During transmission, the node monitors the bus to detect competing messages, which may collide with its own, in which case transmission would be broken off for a brief span before resuming. However, such collisions are "comparatively rare."

Token passing, like CSMA/CD, is also a contention resolution scheme, but with some different wrinkles.

In a physical ring, where each node, or resource station, reads data from the left and passes it to the right, token passing provides a means by which the delay at each station can be minimized while the station initiates transmission. It does this by generating a code, or token, that tells the node it is its turn to transmit.

The station then transmits from its memory to the station to the right and, when done, transmits the token.

Token passing is more "vulnerable" than CSMA/CD in a case where the station that has the token fails to pass it on because it has been unplugged. Then, "everything comes to a stop." One way to handle that dilemma is to have stations fall back into a CSMA/CD mode to reestablish the token. Such contingency plans make token passing more "complex," according to the report.

On the positive side, token passing may be used in a physical ring or as a logical ring on a bus system, whereas "CSMA/CD is a protocol for contention management applicable only on bus systems," the study claimed.

That local area networks do not require the traditional call establishment procedures that characterize a switched telephone network is very important.

In fact, the report said, the composition of ring and bus networks make it possible to "design systems based upon full connectivity that would be impossible, or at least very impractical, with traditional point-to-point or switched network topologies."

Network Standards

Microcircuitry has contributed greatly toward that connectivity through large-scale and very large-scale integrated technology, which has made it possible to build ring or bus interface units "relatively inexpensively," the study added.

Turning to standards, the IDC report said that "relative to the normal time cycle for the adoption of standards," work on a local area network standard is moving at "a furious pace."

The IEEE 802 Local Area Network Standards Committee, formed in 1980, is the primary force behind that movement. Its overall goal is to "develop a standard that will make it possible to transmit frames between machines of common architecture over a medium shared by machines of multiple architectures."

The 88-page "Local Area Networks" report is available for $3,500 from International Data Corp., P.O. Box 955, 5 Speen St., Framingham, Mass. 01701.

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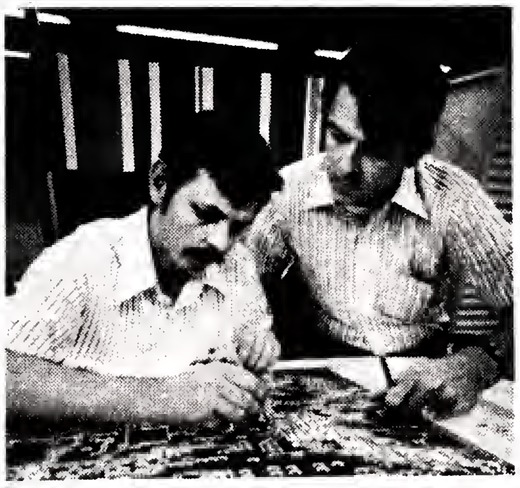

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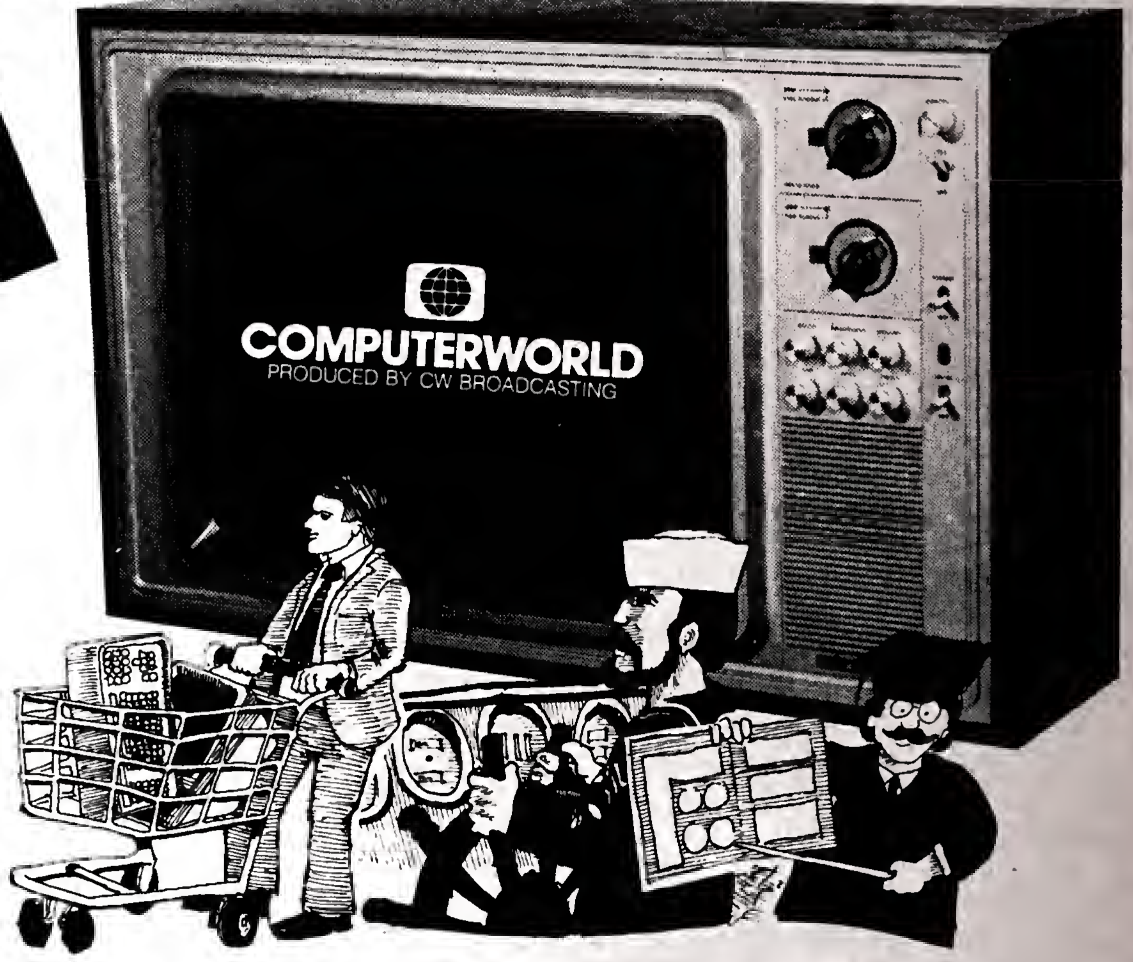

This Week —

- **How to Select Your Own Micro — Part II**
- **Simulated Ships Use Computers to Train Captains**
- **Learning Computers with Cardboard Cutouts**

SCHEDULE FOR WEEK OF: October 12 (Monday) through October 18 (Sunday).

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New York	WOR*	9	Sat	9:30 AM
Los Angeles	KWHY	22	Sat	Noon
Chicago	WFLD	32	Sat	10:00 AM
San Francisco	KTSF	26	Sat	9:30 AM
San Jose	KSTS	48	Sun	4:30 PM
Philadelphia	WTAF	29	Thurs	10:30 PM
Allentown, PA	WFMZ	69	Sun	6:00 PM
Boston	WLVI	56	Sat	11:30 AM
Washington, DC	WDCA	20	Sat	Noon
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If it looks like a ship, acts like a ship and feels like a ship, then it must be a ship, right? Wrong. It's a simulated ship's bridge at the U.S. Merchant Marine Academy that uses a sophisticated, computer-driven system both to train future captains and to provide information used in the improvement of maritime navigation systems. You'll get the whole picture on *"Computerworld"* this week. PLUS, Len Lawrence continues his interesting five-part series on how to select the microcomputer that's just right for you, and Jan Holmes shows us a "paper computer" that makes the concept of a computer so easy to understand that even grade schoolers can learn it.

There's a lot that's new this fall on *"Computerworld,"* including new graphics, new features, new talent, new format and new stations. Check the station list every week to see if we've changed time or station in your area. And, if you don't live within viewing range of our network, you may now be able to get us on cable, on WOR, which can be seen in more than five million cable homes around the country.

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Connects IBM Processors

Link 'First' to Tie Bank, Securities Firm CPUs

By Bob Johnson
CW New York Bureau

NEW YORK — What is claimed to be the first computer-to-computer link between a bank and a securities firm was announced by Irving Trust Co. and Salomon Brothers here recently.

Irving Trust, one of the three major clearing banks for government securities, said the new system, which directly connects its IBM 3033 CPU with Salomon Brothers' IBM 370/158 CPU via a DEC PDP-11 Model II controller, will increase both the speed and accuracy of the government and money market securities clearing process.

Neil T. Maher, vice-president of operations at Irving, explained that Irving acts as a "back office" for firms trading in U.S. government securities. The bank's computer, which is tied to the Federal Reserve Bank's computer, receives information needed for transactions directly from Salomon Brothers' computer, eliminating almost all of the paperwork previously needed.

This securities clearing is valued at more than $2 billion daily, according to Irving.

Traditionally, when a dealer bought securities, the information would be entered into the firm's computer and instructions would be sent to its bank by paper, telephone or tape, to pay the selling dealer and to secure the securities on its behalf at the bank's account at the Federal Reserve in New York.

The same process also held true for the selling dealer, who would deliver the securities to the buyer's bank through the Fed and receive payment using a paper, telephone or tape vehicle.

After the transaction was completed, both banks would then have to inform both securities firms by one of the previously described methods, confirming that the deal was settled.

However, with the new system the delivery of paper or tape is not required and settlement is electronically confirmed, Irving said.

Maher said that the system speeds settlement because there is no delay in receiving instructions or in providing verification to the customer. "It also reduces the chances of error because information is entered only once — to the customer's computer," he added.

Irving also pointed out that the system is automatically in proof, so there is no end-of-day reconciliation, which routinely happens and is sometimes lengthy.

In addition to being of value to government securities dealers, Maher noted that the system is also suitable for other banks and securities firms that clear a substantial volume of money market transactions.

He also noted that the system receives instructions and generates settlement confirmations for both book-entry and physical money market securities transactions.

Irving Trust has been hooked up to the Federal Reserve Bank for funds and securities movement since 1976. It was, the company said, the first bank to have a direct connection to the Fed's Wire Network, a teletype-based system.

Adapso Text Lists DP Tax, Sales Laws

ARLINGTON, Va. — The Association of Data Processing Service Organizations, Inc. (Adapso) has published *The Adapso Sales and Use Tax Survey*, a 129-page compendium of the state sales and use tax laws covering computers and related services in each of the 50 states and the District of Columbia.

The reference text is written in layman's terms to aid any purchaser or vendor of remote processing services, computer hardware, software, professional services, custom programming, raw computer time, integrated hardware/software systems and computer maintenance with the right tax tables.

The survey costs $150 for non-Adapso members and is free for members.

A quarterly update service will be offered to purchasers beginning in 1982. Adapso is headquartered at 1300 N. 17th St., Arlington, Va. 22209.

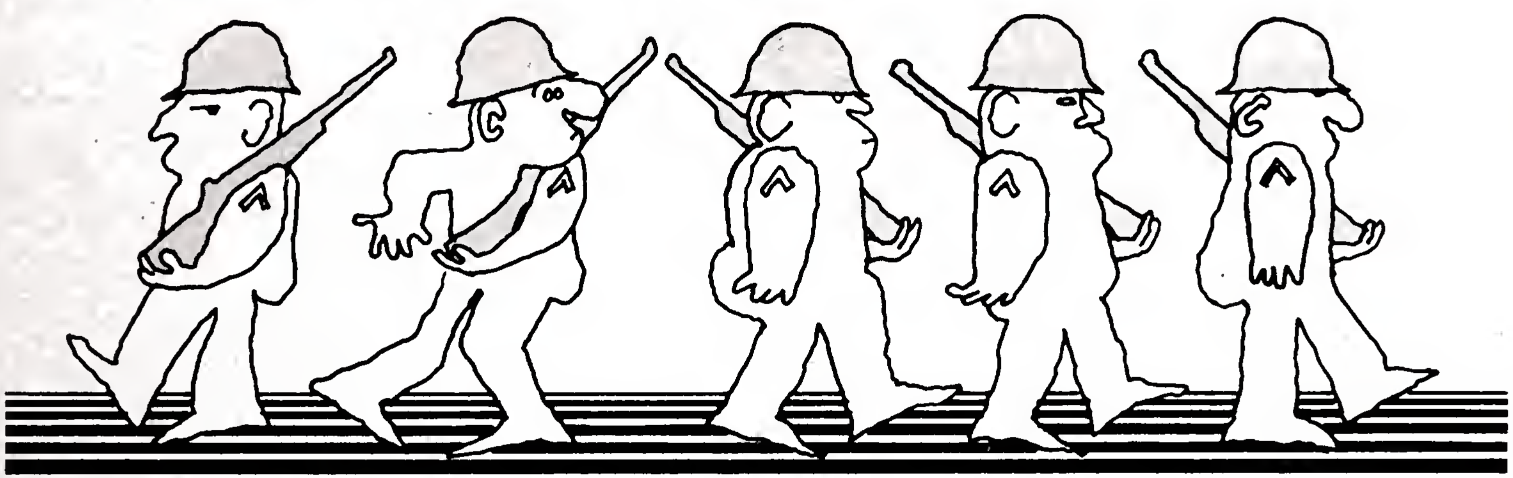
Publication Surveys Medical DP Vendors

NEW CARROLLTON, Md. — A list of more than 300 vendors of medical, hospital, pharmacy and health care-related computer systems is available from Analinc Corp.

Updated weekly, the Medical System Vendor List is available in machine-readable form. It contains the vendors' names, addresses and telephone numbers, according to Analinc Corp.

The list can be purchased for $45 from Analinc, 7611 Vicar Place, New Carrollton, Md. 20784.

IBM & THE INDUSTRY ABOUT-FACE
New DP Strategies March On!



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Teaching Them About Micros

Amateur DP Clubs Rescuing Beleaguered Execs

By Bob Johnson
CW New York Bureau

NEW YORK — Beleaguered metropolitan DP executives plagued by a shortage of technical information about the microcomputers they now find sitting on their desks are turning to a new resource for help.

Amateur computer clubs, which combine the technical expertise of DP persons with a common social interest in computers, have emerged offering a storehouse of information for the new micro user.

More than just a gathering of enthusiasts, the computer clubs have become a viable alternate source of information for businessmen needing help.

According to Susan Perricone, an independent programming consultant and spokeswoman for the New York Amateur Computer Club, Inc., local businessmen are coming to the club's meetings for information about microcomputers, which they cannot readily find through traditional channels.

Because larger companies are not supporting micros with maintenance personnel as heavily as large computer manufacturers, those who are having hardware problems in the workplace with desktop terminals are not getting solutions, Perricone said.

In addition to a lack of hardware support, the technical writing and documentation supplied with microcomputers is still in its "primitive stages," she stated.

"People hard pressed to find solutions to their micro problems have contacted the club, where very often one of our members has confronted the same problem and can help," Perricone said.

Many DP pros proficient in the realm of large systems with multiple configurations and high-level software find computer clubs a help in educating themselves about machines they now use in their DP environments.

One computer professional, Lawrence LaBella, a systems analyst at Peat, Marwick, Mitchell & Co., a traditional big system man and member of the New York club, said that even though the differences between large systems and microcomputers are very evident, there are basics generic to all computers.

"A problem I once had, which required cleaning of a cassette tape for a micro, made me aware of a tape cleaning situation needed when a problem arose in the large system environment," he said.

"Working with the micros puts you into a computer mind set that could be valuable later on," according to LaBella.

A DP manager at a major bank in this area noted that the concept of distributed data processing is better understood by a person who grasps the idea of the micro as it fits into an entire operation.

"Using a computer club's resources to troubleshoot problems impresses the higher-ups in computer management when they notice that you can fix DP problems at many levels," he said.

Other Advantages

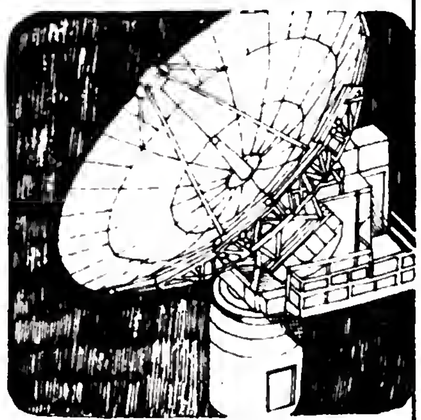
Perricone revealed some other advantages computer clubs offer in supplying information.

"Users' groups, which are an excellent source of help, may not be as candid or as lively about the information they hand out," she said. "The reason is because they are sponsored by vendors. Computer clubs, however, are independent and are usually straightforward about a machine's assets and liabilities," she explained.

The New York club, which has about 250 members, can supply knowledge about Tandy Corp. TRS-80s, Apples and S100 systems, which, according to Perricone, are the most popular micros among club members. She estimated that there are about 200,000 S100 systems, one of the oldest micros in the field today, which makes a great deal of information available from users.

"Computer clubs attract people with in-depth technical expertise in hardware and software," Perricone said. "Most importantly they are willing and often happy to share their knowledge with those who need it."

Software Engineers



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Michael Evans, Manager of Software Standard Procedures and Control, will be speaking on "Software Productivity: A Fresh Approach for the 80's." Saturday.

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Larry Long's List of Professional Societies

• ASSOCIATION OF REHABILITATION PROGRAMS IN DATA PROCESSING (ARPDP)

Purpose and Objectives: ARPDP is an international nonprofit educational association. It was formed by nonprofit training projects dedicated to utilizing computer programming as a career for persons with handicapping conditions.

ARPDP's goals are to promote communications between programs designed to train handicapped persons in the skills of data processing. To that end, it publishes a quarterly newsletter, "Viewpoint."

Among its members, the organization seeks to establish standards and procedures for programs to insure the maximum benefit of the handicappers served. The organization also provides assistance to new training programs.

Membership in the program consists of data processing personnel and rehabilitation specialists as well as handicapped who have either been involved or are involved in the training programs.

For More Information: Robert Leneway, Chairman, Board of Directors, Association of Rehabilitation Programs in Data Processing, Michigan State Technical Institute & Rehabilitation Center, Alber Drive, Plainwell, Mich. 49080.

• COMPUTER MEASUREMENT GROUP, INC. (CMG)

Purpose and Objectives: CMG is an organization of computer performance evaluation (CPE) analysts and of computer professionals interested in the new and developing CPE technology. The primary objectives of CMG are to introduce newcomers to the CPE field; to upgrade the skills of experienced professionals; to put different approaches to the field in a practical content; to keep professionals in our field focused on results.

CMG serves its membership through a number of regional groups and through a national organization. It holds an annual international conference, has an active vendor liaison program and publishes a technical newsletter, a journal, and conference proceedings.

For More Information: M. Boksenbaum, Secretary, CMG, P.O. Box 26063, Phoenix, Ariz. 85068, (602) 995-0905.

• COMPUTER PERFORMANCE EVALUATION USERS GROUP (CPEUG)

Purpose and Objectives: The purpose of CPEUG is to support the economic and effective planning, acquisition and utilization of Federal Automatic Data Processing (ADP) resources; to provide for the exchange of technical information relating to the performance of automated information systems, software, and services; to advance the development of quantitative methods for instrumentation, analysis, and prediction of computer system performance; and to encourage the thoughtful use of information technology in meeting agency mission objectives.

The primary activity of the CPEUG is an annual conference in the October/November timeframe.

Founded by the U.S. Air Force in 1971, Cpeug's sponsorship was later shifted to the National Bureau of Standards.

For More Information: Dennis M. Conti, Advisory, CPEUG, National Bureau of Standards, Room A265, Technology Building, Washington, D.C. 20234.

Larry Long is compiling a list of professional DP/Computer societies and organizations. To be included, societies and organizations should send a brief description of their purposes and objectives to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

• WOMEN IN INFORMATION PROCESSING (WIP)

Purpose and Objectives: WIP is an international organization of women in the computer, word processing and related disciplines. The purpose of the organization is to advance the information processing industry by helping women benefit from opportunities created by automation, whether they work within the industry or work for end users, and by attracting additional qualified women to the industry.

One of WIP's main emphases is to help women build professional contacts more quickly by arranging ways to systematically introduce women in our industry through four complimentary and constantly expanding spheres of influence: networks, seminar gatherings, affiliated groups, and *Parity* magazine.

The WIP Speakers Bureau coordinates cooperative efforts with other groups, both inside and outside our industry, bringing regular and highly visible opportunities for Forum members to speak, help arrange product demonstrations and exhibits, and otherwise expand their sphere of contacts.

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What Makes DP Auditor Different?

Turnaround Time

By Larry E. Long

Q **I am employed as a DP auditor. Could you clarify the distinction between a computer audit specialist and a DP auditor?**

A The title "DP auditor" is internationally recognized as representing the breadth of the DP auditing function — operational audits, applications audits and systems development audits. Other audit-related titles are peculiar to a particular organization and designate a subset of the DP audit function and/or represent degrees of proficiency.

The only time I use the term "DP" is in reference to the DP auditor. I personally prefer "MIS auditor" or "information systems auditor" to the somewhat dated "DP auditor."

Q **I am director of management information systems for a relatively small, but very involved DP shop. We have been successful in implementing new, cost-justified, well-designed applications.**

My systems and programming staff is young, aggressive and very talented. we seem to always cover every aspect of application development (including timely delivery) with the exception of user documentation. This never seems to get done. Months later, we are still called upon to rectify a problem that should have been answered through documentation.

My staff readily admits the need for documentation is urgent. I have tried extra days off, bonuses and job elimination in hopes of changing this around. Do you have any suggestions for this "too busy for documentation" problem?

A If you have time to continually rectify problems resulting from poorly written user manuals, you have time to do it right the first time. Your problem may be founded more on lack of know-how than willingness.

In theory, the contents of the user documentation is embedded in the systems and programming documentation. The task is to transcribe and reformat appropriate documentation such that it can be understood and not misinterpreted by the user.

Establish a standard format for user manuals and for follow-up user training. The following user manual format has been used successfully: objectives of system, description of system, work flow and general operating procedures, instructions for completing and understanding input/output, data collection and update procedures, control, and a glossary of unique terms. A user training program should include system purpose and objectives, differences between old and new procedures, overview of system operation, use of the user manual, and duties and responsibilities of all concerned.

Have you considered hiring a technical writer or documentarian to assist in the production of user manuals?

Q **During a recent conference I was intrigued by the presentation of a computer system developed by a competing company. Ironically, we also have been working on a similar system.**

Certain aspects of his approach sounded interesting and could change the direction of our development effort. Before recommending any changes, I would like to discuss details and evaluate the worth of their system. Is it appropriate to make contact with someone from a competing company?

A Under the circumstances, yes. I find professionals in our business willing and probably even anxious to share their ideas with others, including competing companies.

I regularly witness persons with common interests (and customers) cooperating to resolve common DP/management information systems problems. This spirit of cooperation is refreshing and should be encouraged as long as the integrity of individual and corporate goals is not jeopardized.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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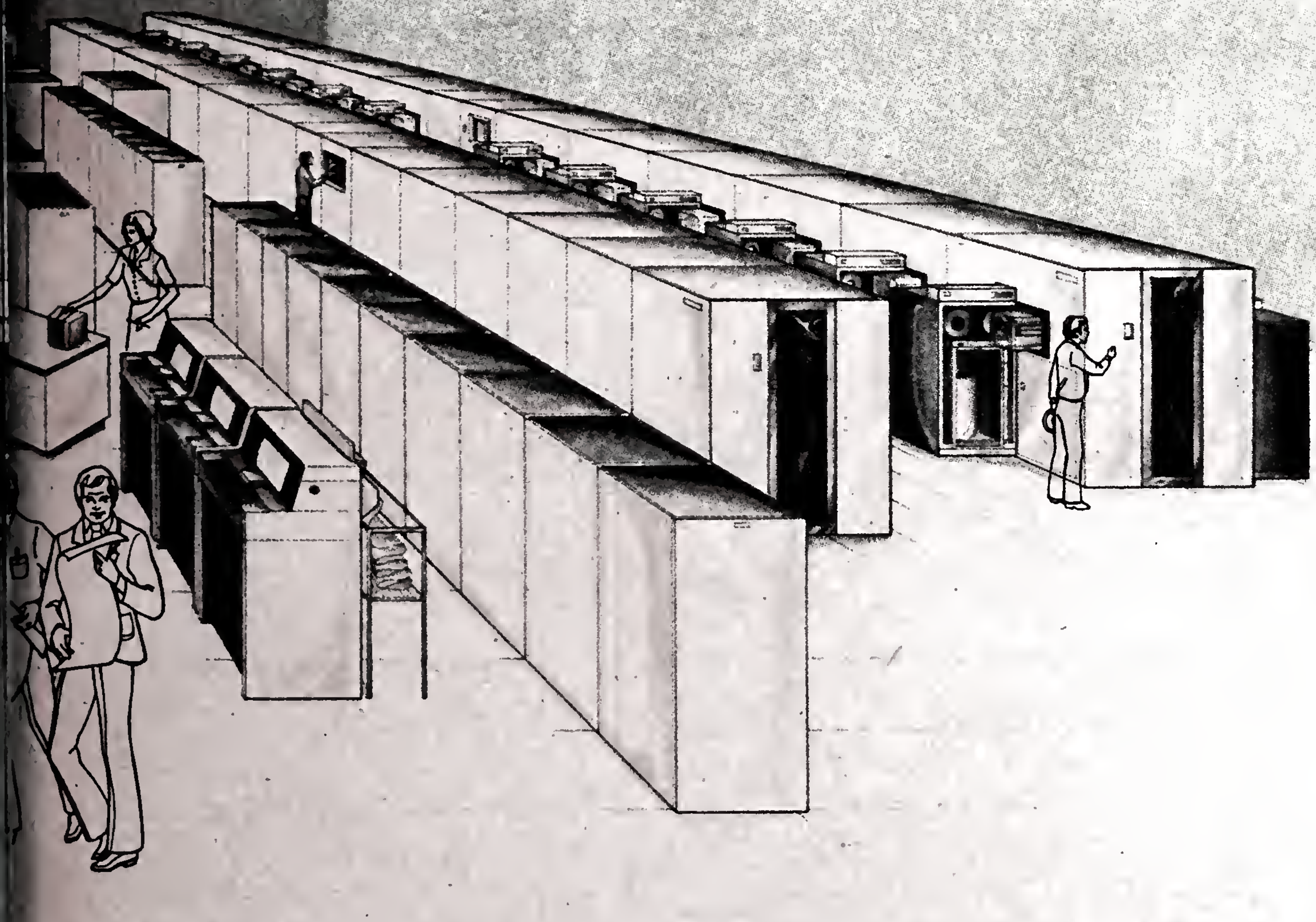

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Service Gives Full Text of 'New York Times'

By Bob Johnson
CW New York Bureau

NEW YORK — The New York Times Information Service, Inc. (NYTIS) recently introduced a computerized on-line information retrieval system that, the company said, allows access to the full text of the *New York Times* newspaper.

Called New York Times On-Line, the system utilizes an on-line data base containing the full text of articles from current editions of the *New York Times* as well as data collected since June 1980.

Paul Berthiaume, president of NYTIS, said the system is a "very powerful retrieval system" which can locate any word, sentence, paragraph or even letter that has appeared in the *New York Times.*

The on-line system can be accessed through packet-switching networks around the world and through most standard terminals, Berthiaume said. He added that the current data base contains more than a year's worth of *New York Times* articles, totaling nearly 100,000 stories.

Taped Story

Information to be stored on the on-line system is received from tapes created at the end of the work day at the *Times'* offices here. The data is collected 24 hours after publication from the *Times'* Harris Corp. 2540 text editing system. It is then matched against a printed copy of that day's newspaper to ensure completeness. This matching of printed newspaper copy with what has been stored electronically combines to make the tape that is then sent to the NYTIS data center in Parsipanny, N.J. There it is input to an IBM 4341 CPU.

The procedure is not as simple as it sounds, Berthiaume explained.

"The information on the tape we receive from the Harris system has to be reformatted and enhanced to be able to work in an on-line format," he said.

He stressed that the procedure demanded a great deal of new software development and revealed that it was done while his shop was converting to a needed OS environment. "This was no package off the street. It took over a year and a half to be developed and we evaluated five different retrieval systems," he said.

Projected input into the system's data base is expected to be close to 90,000 items per year or 1,800 items each week. According to NYTIS, each item contains bibliographic information, such as publication date, page and column number and the type of material. A summary of the article with accompanying descriptions or graphs, charts, pictures or maps also appears.

Search Procedure

According to Robert S. November, vice-president of information services of the New York Times Co., a new procedure for data base searching has been devised with the on-line system. He said that with its complementary search techniques, free text and controlled vocabulary, a user can find words that may be present in a desired article or search for articles under subject terms and geographic names.

Howard Angione, a technical editor for the *New York Times* who has been using the system since last fall in various stages of progress, said that he was impressed with it. "It's amazing how fast you can find things and the best part is that it doesn't argue with you. Most other retrieval systems make you go through many questions."

Berthiaume said that the possibility of having all of the *Times'* information available at home could be a tremendous benefit for *Times'* staffers.

NYTIS, which is a subsidiary of the New York Times Co., has provided a commercial information service since 1969 through its information bank, which contains abstracts of *New York Times* articles and other publications.

November said that the New York Times On-Line will be offered on a contractual basis to customers at a cost of about $150/hour.

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Shows 13-Month Trends

Electric Company Adds Usage Graphs to Bills

By Lois Paul
CW Staff

ALLENTOWN, Pa. — A computer-generated graph accompanying their electric bills is letting consumers here see how their energy is being used as well as where their dollars are going.

Pennsylvania Power & Light Co. last year began sending monthly statements to its residential customers that graphically show how much energy they have consumed over a 13-month period.

The data is contained in a bar graph format the company has dubbed an electric use profile. It also includes a statistical printout of payments to date, current energy rate, tax surcharge and current billing.

The graph is intended to enable consumers to track the results of their energy conservation efforts and to determine when to allocate money for future conservation measures, such as installing new insulation.

"We have been urging conservation since about 1971," Michael Kislow, assistant manager of public information for the utility company, explained. "We have had quite a number of different energy conservation programs and have continually looked at ways of communicating the need for conservation to customers."

The electric use profile grew out of a research and development effort by the information systems programming group, according to Bill Campbell, business systems manager.

It was on the drawing board for six months before it was installed in June 1980, he said. "What it boils down to is that when the right person saw it, it came out of a research and development environment and went onto a priority one. A little more effort was put into it and we got the thing on board in about 2½ months.

"Really, they are the ones that generated the idea and it fit in very nicely with our overall program of conservation messages to the customer," Kislow added.

The software is PL/I-based and was developed in-house for use with the firm's IBM 3800 laser printer. Pennsylvania Power & Light uses an IBM 3033 with 16M bytes of memory to analyze each customer's rate of energy consumption and to generate an electric use profile on the lower portion of each bill.

A bar graph shows the customer's average daily kilowatt-hour usage for a 13-month period ending with the current billing period. A separate printed report shows the usage figures for the current month and that of the same month a year ago.

Kislow said the program does not involve additional cost for the utility company because it is just another application of the laser printer they already had on board.

Customer reaction has been excellent, he said. "We had at least a hundred, possibly more, customers contact us directly, telling us they really like the idea."

He said it gives the customers a good idea of the relative success of whatever conservation methods they are putting into effect. "They are seeing almost the immediate effect of that the following month."

On the side of the graph, the temperature of the billing period that the current month covers and what the temperature was a year ago is printed. "So they are able to see any relationship between temperature affecting the bill," Kislow added.

Although he could not attribute anything directly to use of the graph, Kislow said Pennsylvania Power & Light is either on target or slightly below its corporate goal of a compound peak-load growth of 2½% per year until the end of the century.

The company received a commendation from the Pennsylvania State Legislature in March for this energy conservation program.

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ATM Spits Out $5,140 for $40 Withdrawal

By Jeffry Beeler
CW West Coast Bureau

PHOENIX — Deborah Hall had only $70 in her checking account when she walked up to one of her bank's automated teller machines (ATM) recently and asked to withdraw $40.

The terminal complied with her request — and then coughed up an extra $5,100.

For an instant, the 21-year-old insurance company clerk imagined herself fleeing with the loot "to Italy or someplace like that," she said. But conscience and good judgment quickly prevailed; within a few hours she had notified local authorities of her windfall and had returned the surplus cash to its source, the First Interstate Bank of Arizona.

The cause of the terminal's sudden generosity was later traced to a malfunction inside the machine itself, which has since been repaired. Bank public affairs officer Chuck Hemann refused to reveal the exact nature of the defect, but did indicate that the trouble was confined to just one of the bank's 80 or so statewide ATMs. "We've never had anything like this happen to us before," Hemann said.

Sole Recipient

Hall, who works for the local office of Massachusetts Mutual Life Insurance Co., was apparently the only recipient of the defective terminal's largess, he added.

The machine's $5,100 miscue occurred on Saturday afternoon, Sept. 26, when Hall accidentally hit the terminal's "savings" button while trying to withdraw money from her checking account. Hall immediately realized her mistake and "since my [bank] card isn't supposed to work with my savings account," she expected her withdrawal request to be rejected.

But rather than abort the botched transaction, the Diebold, Inc. Model 910 terminal obligingly spit out $600 in crisp, new $20 bills. Astounded, Hall deliberately repeated the procedure to see if the machine would make the same mistake twice — and sure enough, out came another $600.

By the time Hall finally tired of the game, the haywire ATM had disgorged 257 $20 bills for a grand total of $5,140.

"I was so amazed to be holding all that money that I just went home and played with it for a while," she recalled.

Closed for Weekend

Later that same afternoon, after her initial shock had faded, Hall tried to call her bank to return the surprise jackpot. But when no one answered the phone — the bank had closed for the weekend — she called a local newspaper instead, explained what had happened and asked for advice.

The newspaper in turn got in touch with the bank, which dispatched a courier to Hall's home to recover the missing cash. "The bank representative really didn't say very much," she recalled. "But he did seem surprised that I hadn't tried to keep the money."

As a reward for her honesty, the bank has scheduled to take Hall to lunch. "The restaurant we plan to take her to is on the top floor of our own building," Hemann said. "It's really a very nice place to eat."

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Handbook, Class Cover WP

MINNEAPOLIS — *The Word Processing Implementation Handbook* and accompanying seminar on videotape have recently been produced by Delphi Data Systems, Inc., a consulting firm that specializes in word processing.

Topics covered in the word processing self-administered minicourse include an introduction to word processing, quantifying benefits, organization approaches, evaluation alternatives, productivity enhancements, training, a supplier directory and managing the existing system.

The text also includes ideas on selling management on word processing, improving efficiency, reducing costs and writing requests for proposals.

The workbook sells for $85 and the videotape costs $850. The vendor is located at 7716 Morgan Ave. S., Minneapolis, Minn. 55423.

Publication to Cover Unix Applications

SAN FRANCISCO — International Technical Seminars is starting a publication for end-user documentation for Unix system applications.

Beginning next month the publication, *Unix Topics for Users,* will appear six times yearly. Each issue will feature a specialized Unix application.

Upcoming topics include writing portable Unix applications, a glossary of Unix terminology, tips and techniques for revising larger manuscripts and applications software development.

Charter subscription rates for the U.S. are $25 for Unix educational license holders and $95 for all others.

Further information may be obtained from International Technical Seminars, 47 Potomoc St., San Franciso, Calif. 94117.

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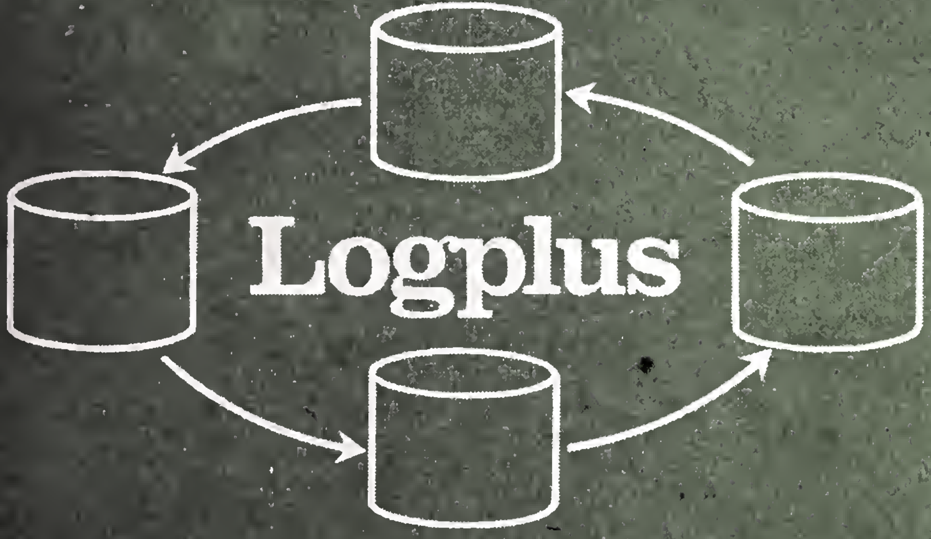

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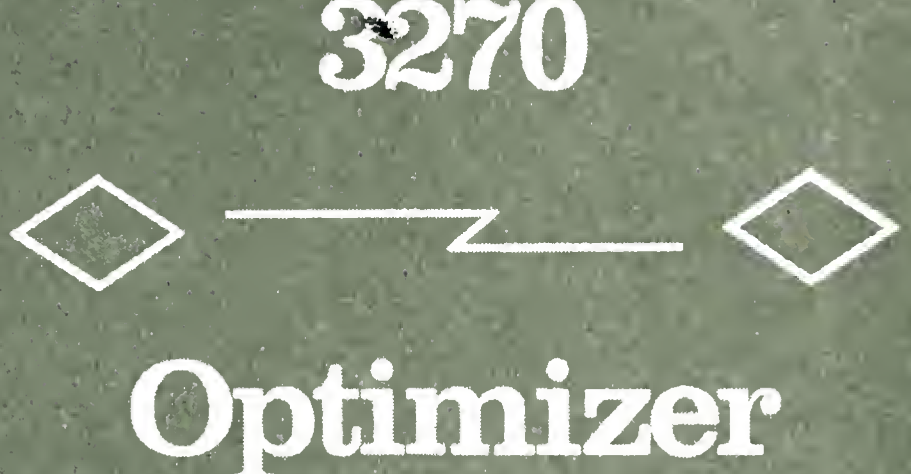

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Elections, Taxes, Parks

County Works Hand-in-Hand With Computers

Special to CW

ST. LOUIS — Computers have a hand in just about everything the county government does here. The system helps elect officials, process tax records and schedule park usage.

Election-related applications are good examples of how the DP center works with county officials, according to Kenneth L. Vaughn, Data Processing Division director.

Terminals are moved into polling places on election day and plugged into hard-wired circuits leading back to the computer center. Once the units are in place, board members verify periodic reports of election results and approve their public release. Other terminals allow election personnel to go on-line to verify prospective voters' status as they appear to vote, he said.

Beyond showing whether a voter is registered and, if so, where he or she lives, the system indicates if an absentee ballot has been requested and sent out. As soon as a person's right to a ballot has been confirmed and the absentee ballot issued, the record is updated through a terminal to block repeated voting.

Throughout the Year

Throughout the year, the on-line system also simplifies handling of file maintenance chores including change of name or address, he added.

The county goes a step beyond classic on-line support. Many of the applications — those for the Election Commission Board room, for example — depend on terminals, but certainly do not need them permanently, so the equipment is moved around to accommodate these uses. To protect the data flow from terminal to mainframe, and keep communications in local mode even when the terminals are some distance from the center, the division laid its own cables to the established use points, Vaughn said.

The county uses punched card ballots, which are read by minicomputer-based turnkey systems from Computer Election Services of California. The minis generate magnetic tape files that become input to analysis programs on the IBM mainframes. In major elections, reporting results to the election commission and to members of the press "can go on every half hour until the counting is completed," Vaughn added.

"Everything," from voter registration to tax billing and collection, park facility reservations, jury selection and the county planning commission's operations, is on the processor. "Much of that work is done on-line and that makes a tremendous difference in the ability to provide timely service to county residents," Vaughn continued.

Operations Base

The county's data processing operations are based on a 2M-byte IBM 370/148 running 24 hours a day, seven days a week under DOS/VS. The 148 shares three IBM 1403 printers, 7000M bytes of disk space on 3330- and 3330-II-compatible drives and eight IBM-compatible tape drives with a 370/145 that has a 768K-byte memory, Vaughn said.

On-line processing under CICS/VS is supported 16½ hours a day during the week and another four hours on Saturdays. The county is using an IBM 3705 communications controller as well as Telex 271 and 272 control units to manage approximately 150 terminals, all but 25 of which came from Telex Computer Products, Inc.

Twenty-one programmers and analysts on Vaughn's staff do their development and maintenance work on-line, supported by a disk-based source statement library system. Job control language specialists and librarians use terminals to set up jobs to be run and a scheduler uses a terminal to schedule the work on the computers.

In general, the county uses its computer power for inquiry and, if desired, printout of data; for data entry to a logging file for later batch updating; and for real-time data entry when immediate results are mandatory. On the other hand, batch-oriented development work has not been abandoned. "You just have to know when that kind of operation is appropriate," Vaughn explained.

The county's Revenue Department has a more direct impact on many of the St. Louis County citizens than the Election Commission and the local center does a lot of work to support this department that is not very different from work done by other government DP operations across the country.

The center produces tax bills for personal property and for real estate as well as license fee bills for merchants and manufacturers. Automobiles are taxed as personal property rather than being subject to excise taxes as in some other jurisdictions, according to Vaughn.

St. Louis County uses its on-line support to enable workers in the tax offices to inquire about the status of any bill and to print a duplicate on-line for the taxpayer who does not have his original, Vaughn said.

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Micro Turns Loss Into Profit for Used Car Dealer

Special to CW

COSTA MESA, Calif. — The Theodore Robins Ford dealership here turned a $30,000 wholesaling loss on used cars into a $5,000 profit within one year with the help of an Alpha Microsystems, Inc. microcomputer.

Utilizing software developed by APR Systems, Inc., Theodore Robins realized its savings while acting as a test site for a computerized sales management system.

"It's given us an edge over the competition," John Felter, general manager of Theodore Robins Ford here, said. "It's helped us zero in on problems we didn't always know existed, putting us in touch with a wealth of accurate information."

The car industry is a business where accurate control and dissemination of information is vital. According to sales business manager Scott Burns, a slip-up in records on any car can cost a sale as well as induce the Department of Motor Vehicles (DMV) to close a business' doors for an indeterminate amount of time, and with no prior warning.

Tremendous Consequences

"For instance, if you unknowingly sell a new car as a V-8, when it's really a V-6, the consequences can be tremendous," Burns said. "If the customer doesn't discover the mistake until after he's driven the car off the lot, he'll bring it back, demand a refund and refuse to do business with you again. Not only have you lost the sale, but you must now sell that car as a used automobile.

"Also, if the car sales paperwork for the DMV is not completed in a timely fashion, the Department of Motor Vehicles may close the dealership's doors or impose expensive fines.

"The normal industry turnaround time for used cars is 37 days," Burns explained. "Before the system was used to track information regarding the time and amount of each used car sale, the cost of space rental and depreciation of each car, we had as many as 40 cars on the lot for more than 60 days.

"Since we've used the system the dealership has been able to decrease that number to five."

On the show floor the system also provides salesmen with a printout within seconds that lists all important automobile details for the customer. These include standard features, factory options, special items added by the dealer and estimated DMV charges.

The computer has helped the finance department by allowing them to get TRW credit reports through the system as well as the gross, service contract and financing details of each sale. And, within minutes, a hard copy can be printed with the number of cars and their special features (such as three-door Escorts with automatic transmissions) that are on the lot at any particular moment.

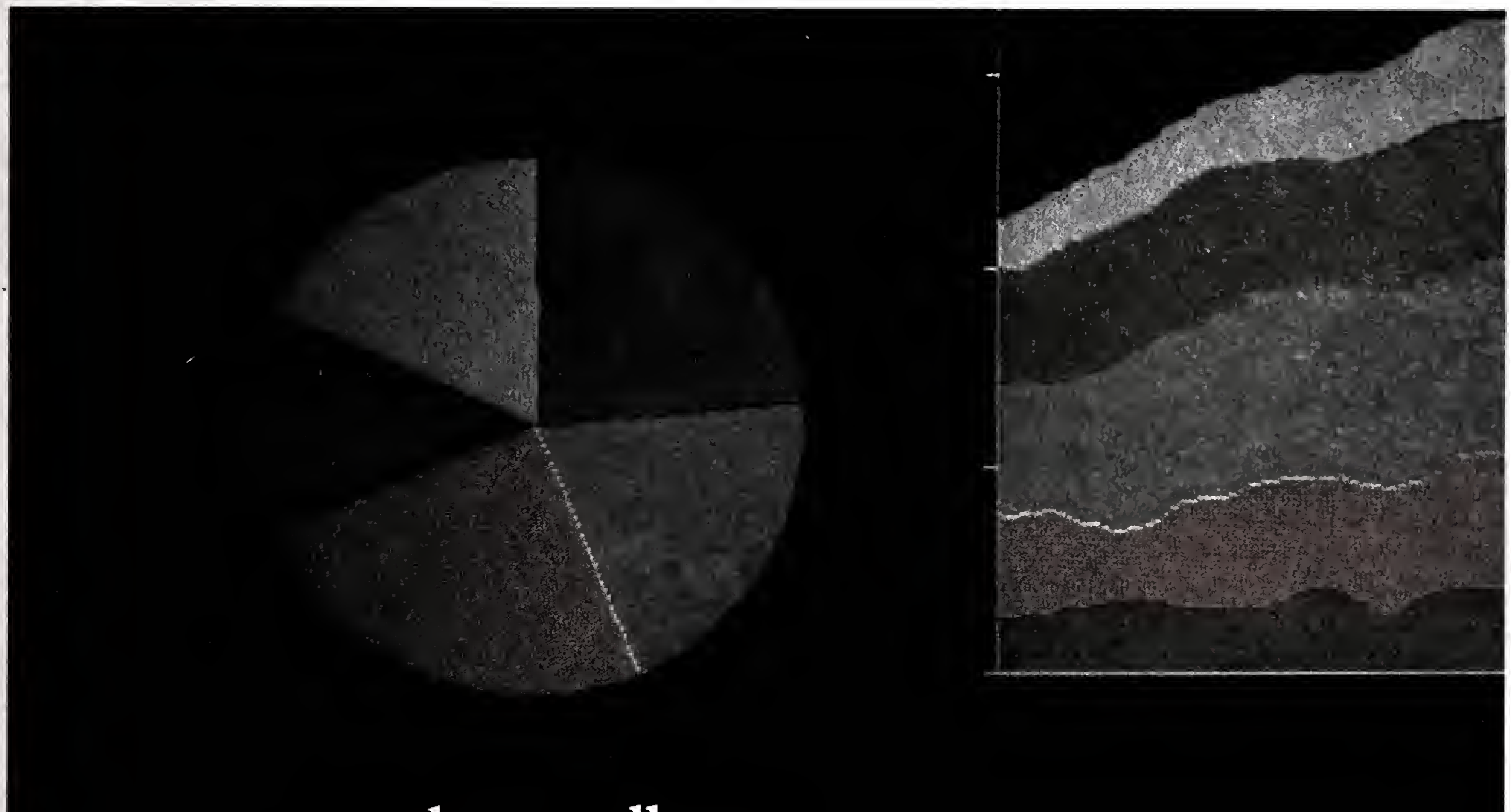
According to Doug Tidwell, system developer and vice-president of APR Systems, Inc., system service problems are minimal. "Since February 1980 when it was installed, the Alpha Micro computer was down only once and I was able to come down that day and repair it."

The Alpha Micro computer is the heart of the Theodore Robins Ford sales management system, which also has a 10M-byte disk drive for data storage, three printers and three terminals. It was manufactured by Alpha Microsystems, Inc.

"We chose the Alpha Micro because of its price and performance," Tidwell said. "Incorporated in the sales management system, it's been very easy to train the users on. Management has even come to depend on it."

"The computer helps me track business on a daily basis and has eliminated much of the manual labor," Felter said.

"I know what banks are buying what calibre customer, what salesman tends to sell to what type of customer, what cars are on the lot with exactly what features. The system has eased the process I must use to evaluate my salespeople's performance, letting me know exactly what's been sold and how the sales figures compare."



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Religious Group Finds Missing Link For IBM 1403, HP 3000

NYACK, N.Y. — Officials at a religious denominational headquarters here decided to keep its old IBM 1403-A2 printer when it upgraded from an IBM System/3 to a Hewlett-Packard Co. 3000 series CPU two years ago.

The Christian and Missionary Alliance liked the printing quality given by the 1403, even though it could not at that time be interfaced to the HP 3000 CPU.

Donald Inghram, computer manager at the alliance, said he especially liked the 1403's ability to print addresses continually onto envelopes without having to print separate labels and then manually attach them to the envelopes.

The alliance prints letters, addresses a missionary magazine and otherwise provides printed communications among more than 1,800-member churches in the U.S. and abroad.

Needed Interface

"We were stuck for a while because there wasn't any interface available," Inghram said. "So we used other printers while we looked for someone who could help us get the 1403 running again, only with our new system."

But it was not until recently that Inghram was able to reactivate the 1403, thanks to the purchase of a printer controller that permits the 1403-Series 33 interface, he said.

The alliance bought the S1403/HP3000 printer controller for $22,000 from Spur Products Corp. of Los Angeles, enabling Inghram to put the 600 line/min 1403 back on-line while retiring the label printers.

Inghram said he hopes now to upgrade the 1403-A2 for a 1403-N1, rated at 1,100 line/min, even though the latter has not been manufactured in nearly 10 years.

"Despite the newer printers, the 1403 series retains its following because of print quality, flexibility and dependability," he said. "The interface so far has been working just great, giving us the quality we need from the 1403."

Two-Day Seminar to Treat Software Configuration Management

LOS ANGELES — A two-day seminar entitled "Software Configuration Management" will be held in three cities through December.

Sponsored by the Education Foundation of the Data Processing Management Association (DPMA), the seminar will be held in Williamsburg, Va., Nov. 30 to Dec. 1; in Washington, D.C., Dec. 7-8; and in Boston Dec. 10-11.

"Guest expert" Rick Frederick, manager of software configuration management at Texas Instruments, Inc., is scheduled to provide an in-depth presentation on the "how-to's" of planning and implementing software configuration management disciplines in both large and small organizations and on key software projects.

The registration fee is $425 per registrant and $405 for DPMA members.

Further information can be obtained by writing EF-DPMA Seminars, Department SCM, P.O. Box 91295, Los Angeles, Calif. 90009.

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Fireman's Fund Developing Insurance Turnkey

SAN. FRANCISCO — Fireman's Fund Insurance Co. announced here it is developing a turnkey system for independent insurance agencies that will be released Jan. 1.

Fireman's Fund is following the course of other insurance companies, such as The Hartford Group, which recently announced an agency/company communications network through which it is linking its agents' minicomputers to its central computer [CW Sept. 14].

The difference with the Fireman's Fund system is that the hardware/software system is being marketed to any independent insurance agency, including those handling other companies' policies, according to news director Dan Brigham.

The system is built around IBM Series/1 equipment running under the EDX operating system and includes Data Base-Plus, an application development package from Tominy, Inc. in Cincinnati.

Data Base-Plus consists of a data base management system, a query/report writer, a screen handler and a print handler. Tominy will provide custom programming support to those purchasing the Fireman's Fund system, Brigham explained.

Fireman's Fund has established a separate unit to develop and market the system, which will be installed in up to six agencies for pilot tests. The vendor will provide preinstallation consultation, planning, training, assistance on conversion of office records to the automated format and routine maintenance services. An agency buying the system also is entitled to future enhancements to the system, the vendor said.

The hardware and software are modular, Brigham explained, and are available in a variety of configurations addressing the specific needs of each agency. The system reportedly has complete interface capabilities.

Pricing for the hardware alone ranges from $30,000 to $50,000. The total hardware/software system ranges in price from $60,000 to $85,000.

The home office of Fireman's Fund is at 3333 California St., P.O. Box 3395, San Francisco, Calif. 94119.

Forecasts Offered For Markets In Three Areas

CROTON - ON - HUDSON, N.Y. — ESG Associates has announced the availability on tape of Special Marketing Area Forecasts for three designated areas: Selling-Area Marketing, Inc., Neilsen's Designated Marketing Areas and Arbitron's Area of Dominant Influence.

For each area the company offers both the Economic Data Bank, containing information on employment, income and total population, and the Demographic Data Bank, containing more specific population information.

The Economic Data Bank tapes are priced at $1,000 for the first and $500 for subsequent tapes. The Demographic Data Bank tapes are priced at $3,000 for the first and $500 for the others, from ESG Associates, 410 Albany Post Road, Croton-On-Hudson, N.Y. 10520.

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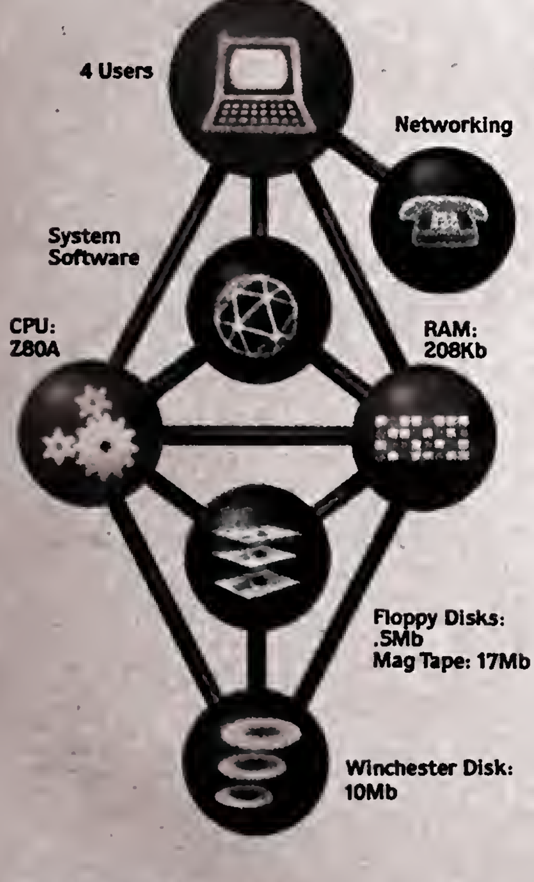

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COMPUTERWORLD

Chinese-American Conference On Small Systems Set Nov. 2-6

SAN FRANCISCO — A Chinese-American conference on small computers will be held Nov. 2-6 in Silicon Valley, Calif., the Asia Foundation announced here.

The conference was designed to provide the foundation's 15-member delegation from the Chinese Computer Society a thorough review of the current state of the art in the American small computer world.

The Chinese delegates will discuss counterpart activities and plans in the People's Republic of China. U.S. academic and industry experts will participate, a spokesman said.

To date, IBM, Burroughs Corp., Data General Corp. and Honeywell, Inc. have agreed to serve as cosponsors of the small computer conference.

The program will consist of the presentation of a theme paper and a series of topics presented by both American and Chinese experts on processing hardware status, memory hardware status, peripheral device status and on-line and batch applications, the spokesman said.

The Asia Foundation can be contacted through P.O. Box 3223, 550 Kearny St., San Francisco, Calif. 94119.

University Graphics Course Aimed at Micro Managers

ROLLA, Mo. — The University of Missouri-Rolla will offer a course in "Computer Graphics: Microprocessor/Personal Computer Systems" Feb. 4-5 at the Orlando Marriott Inn in Orlando, Fla.

The course reportedly was designed for managers, administrators, educators and graphics users responsible for evaluating, selecting, acquiring and implementing desktop computers.

Issues covered will include graphics display functions, processor/memory and interface to other equipment and peripheral matters required for practical applications of computer graphics.

The fee for the course is $195 and includes all class materials and a reception. Further information on the course and preregistration is available from Martha K. Fort, coordinator, Arts & Sciences Continuing Education, 105A Humanities-Social Sciences Building, University of Missouri-Rolla, Rolla, Mo. 65401.

Furst Elects 1982 Officers

ORLANDO, Fla. — Financial Users Researching Systems Together (Furst), a banking and data processing systems users' organization, has announced its 1982 officers and directors.

John N. Kreider, vice-president of data processing for the Fulton Bank in East Petersburg, Pa., has been named president of Furst and R.C. Garlington, data processing officer of American National Bank & Trust of St. Paul, Minn., has been named vice-president.

In addition, Larry Glass, director of marketing and customer support for UCB Systems, Inc. of Des Moines, Iowa, has been named secretary and Perry Muir, data center manager and and officer of National Bank of the Commonwealth, Indiana, Pa., has been named treasurer.

Furst's annual banking forum and industry seminar will be held Feb. 21-24 here.

Furst can be reached through P.O. Box 2269, Orlando, Fla. 32802.

'What a Ripoff — It Turns Out to be a Crummy Football Game.'

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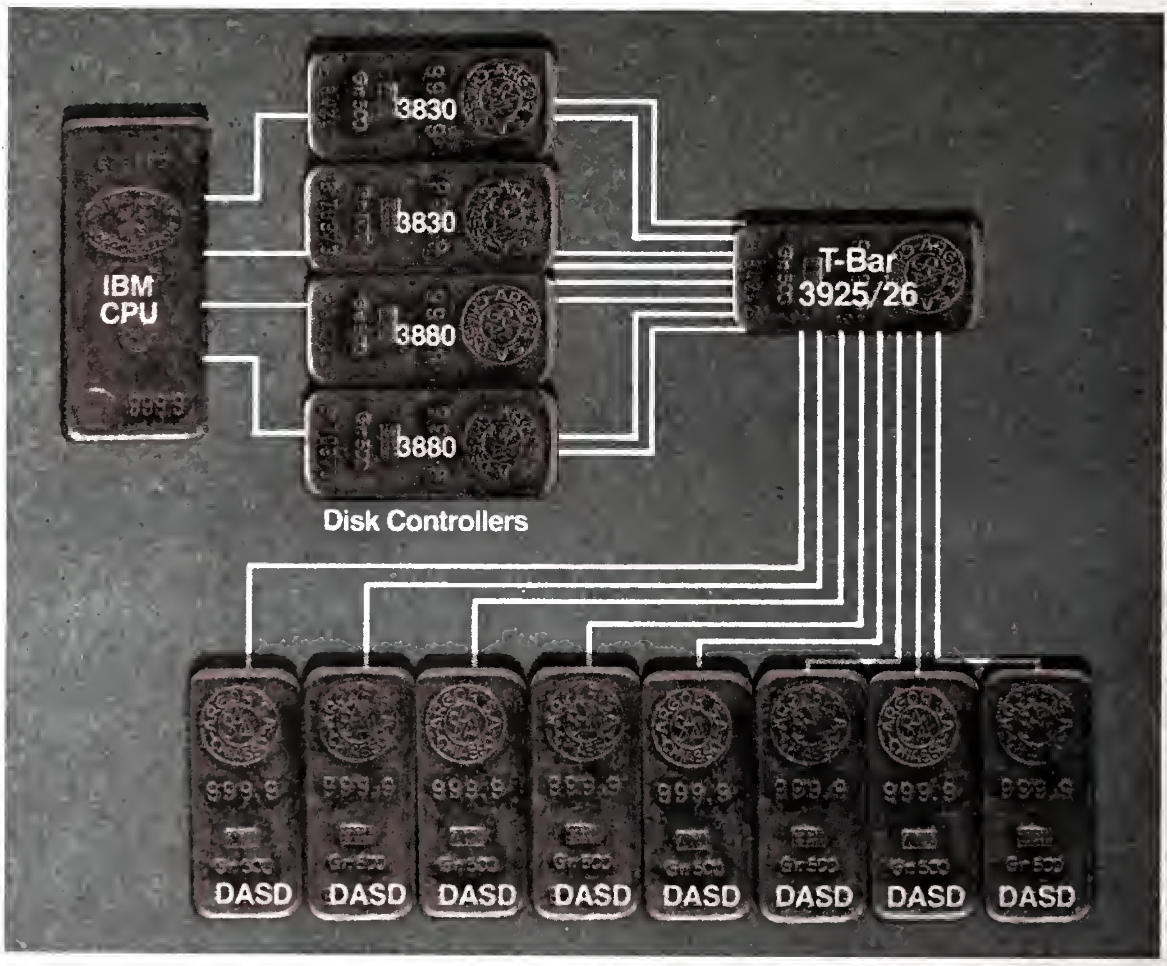

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To Grow With Company

Restaurant Supply House Fills Gap With PCM

Special to CW

LOS ANGELES — Filling the gaps between IBM processors is often a problem. Sometimes a firm's current processor is too small, but the firm cannot justify making the next step up the IBM ladder. Interstate Restaurant Supply Co. here recently was faced with such a decision and purchased a plug-compatible mainframe (PCM) as an alternative.

"We needed a processor that would grow with the company. We didn't want to over-buy, then have to depend on future growth to make the machine cost effective," according to DP vice-president Bill Campbell. "On the other hand, we didn't want to curtail future growth. The Magnuson Computer Systems, Inc. M80 system was an attractive alternative; it had the extra throughput and growth potential we needed," he added.

M80/4 Selected

Interstate, one of the nation's largest restaurant supply companies, selected an M80/4, which it has since field-upgraded to an M80/32. A second M80/32 was then installed by the restaurant supply company to service more than 5,000 restaurants and institutions in Southern California with some 10,000 different food, supply and equipment items, Campbell said.

Along with the two Magnuson M80s, which have a total of 6M bytes of memory, 10 channels and two console printers, the Interstate installation includes 32 3330 disk drives, seven 3420-7 tape drives and three printers.

One M80 system uses DOS/VS (Release 4) and CICS, and the other, VM/370 with OS/VS1, CMS and DOS/VSE, the firm said.

Interstate could have replaced its IBM 370/135 with an IBM 370/158, "but that would have entailed changing the electrical system to provide sufficient power — or waiting at least two years for delivery of a 4341.

"The problem was that we had an immediate need for more computing power. To wait for the 4341 was out of the question," according to Campbell.

DP operations are crucial to Interstate, which guarantees next-day delivery on any item called in by 5 p.m. In fact, with the Magnuson M80s, all the day's business DP requirements are accomplished between 5:30 p.m. and 6:30 p.m. including running a vehicle scheduling program, Campbell said.

Reduced Overhead

"With our 135, we processed receivables in three hours and our vehicle scheduling program took two more hours. Now, with the M80s, it takes 45 minutes for receivables and an hour for the vehicle scheduling. What this means is that we can reduce overhead and, while still growing, not have to add staff," Campbell said.

"We're completely dependent in our business on the computer system, which routes trucks, then issues 'picking' documents for the warehouse. As each item is sold, profit is figured and accumulated daily and our inventory is updated continuously," Campbell said.

Other DP operations at Interstate include accounts payable, accounts receivable, profit and loss statements, current sales data, year-to-date sales, gross profits, inventory and order entry, according to Campbell.

RPI Program Awards Micros As Scholarship

TROY, N.Y. — Twenty-one freshmen at Rensselaer Polytechnic Institute (RPI) will receive free Atari, Inc. 800TM Personal Computer Systems for their personal use.

The personal systems are valued at more than $4,000 each, with capabilities including color graphics, sound generation and word processing.

These individuals represent the first participants in RPI's recently established David M. Darrin Rensselaer Scholars Program.

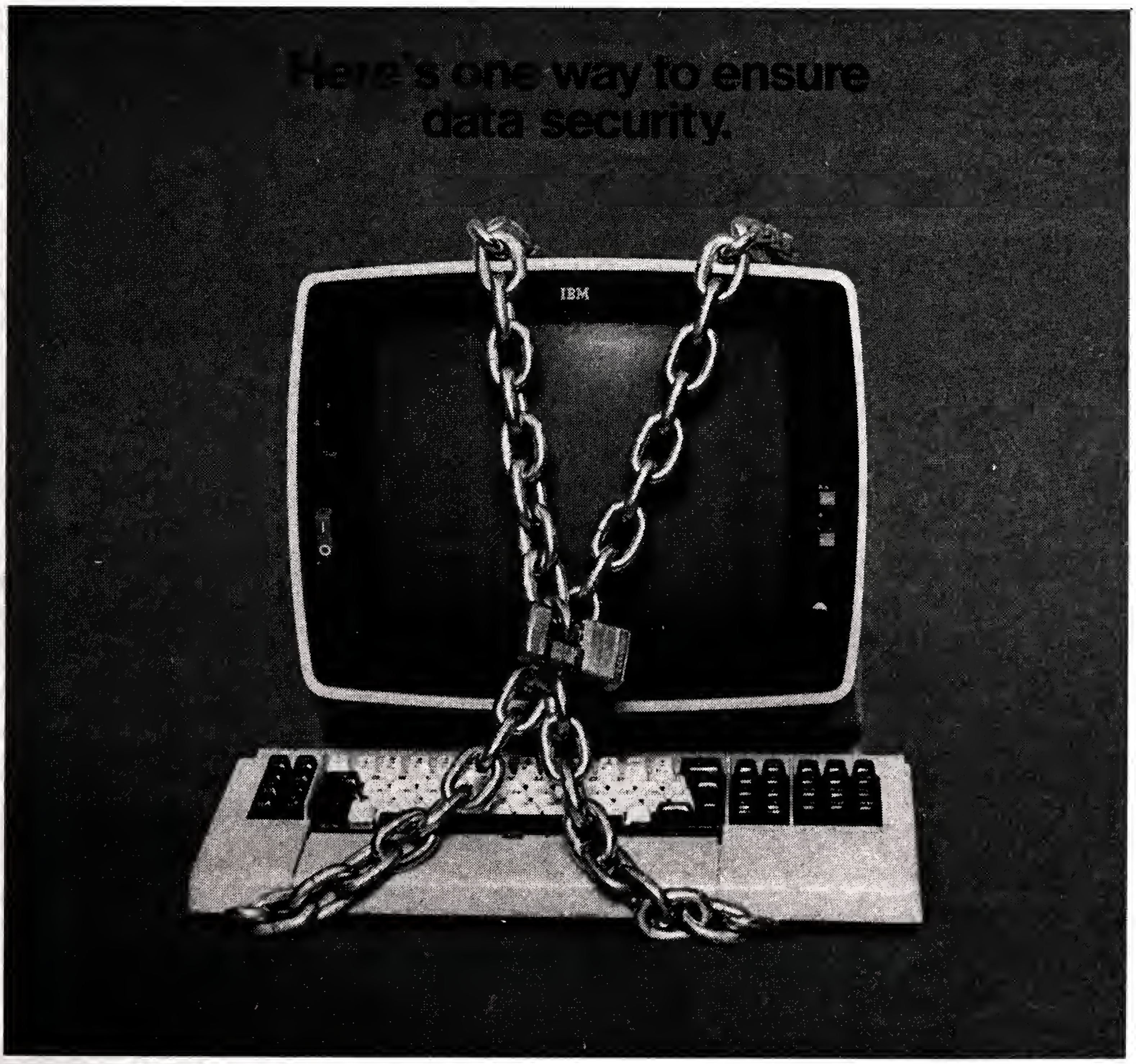
Exceptional Scores

The winners held high academic records and exceptional Scholastic Aptitude Test (SAT) scores; the average score was 732 for verbal and 761 for math.

In addition to the microcomputers, the scholars will receive $2,500 a year to help defray the cost of an RPI education.

The Darrin Rensselaer Scholars Program was conceived to give a small, select group of undergraduates the opportunity to experiment with the educational and research uses of the systems on an independent basis.

The program is supported by David M. Darrin, RPI class of '40, who is a presidential counselor and longtime benefactor of the institution.



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TOP SECRET is the first product from the recent merger of CGA Software Products Group, Inc., and Allen Services Corporation. Other products are: Super-MSI, MSM, GCD, DCD II, PAC/MASTER.

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Phone: 800/543-7583.
In Ohio, call collect: 513/890-1200.

Communications Network Conference Scheduled for Jan. 11-15 in Atlanta

ATLANTA — The Conference Management Group of CW Communications, Inc. will hold its fourth annual Communications Networks Conference at the World Congress Center here. The conference is scheduled for Jan. 11-15.

Eighty sessions are scheduled covering a range of communications topics including electronic mail, teleconferencing and local area networks, the firm said.

Special Program

The conference will feature a special program: "Electronic Mail and Office Communications Day," which will be directed by John Callahan from Information Technology Research, Inc.

The program will discuss electronic mail and office automation and will be similar to the program offered at last year's conference, the firm said.

Sessions begin at 7:30 a.m. and close at 9 p.m. Exhibits are open from 11 a.m. to 3 p.m., and lunch will be provided on the exhibit floor, a spokesman said.

The conference will also sponsor a full-day series of in-depth sessions on technical and managerial topics featuring university instructors.

Sessions include the basics of local area networks, packet switching, data and voice communications, according to the firm.

The conference costs $395 until Dec. 7, the firm said from 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

Telecom Systems Sets Courses On International User Networks

CEDAR GROVE, N.J. — Telecom Systems Group, Inc. will present two courses this fall for communications professionals concerned with international user networks. The courses are called "Designing and Installing International Private User Networks" and "Managing International Private User Networks."

The two-day course on management is being presented for the first time and provides an overview of network management considerations in network design and installation. It will be held in New York, Oct. 26-27; London, Nov. 12-13; and again in San Francisco, Dec. 3-4.

The three-day course on network design is scheduled for New York, Oct. 19-21; Houston, Nov. 4-6; London, Nov. 9-11; and San Francisco, Nov. 1-Dec. 2.

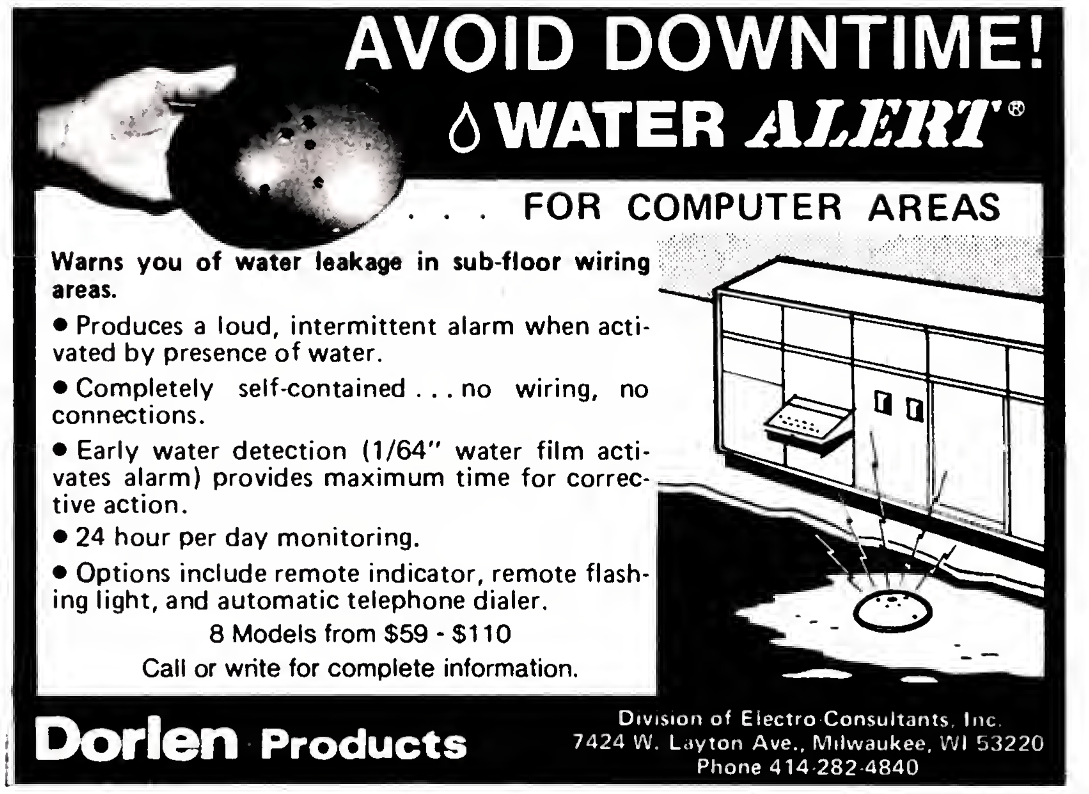
The management course costs $550; the design and installation course is $750. Group discounts are available from the sponsor at 579 Pompton Ave., Cedar Grove, N.J. 07009.

London Meet To Cover World Nets

LONDON — World telecommunications will be the theme of the two-day *Financial Times* of London's conference slated to take place here Nov. 16-17.

The conference will be divided into four main sections that will examine in depth the American experience of deregulation, Britain's controversial experiment in liberalization, the European system and telecommunications in the Third World and trends in technology and developments in new services.

Sir William Barlow, chairman of the engineering group at Thorn EMI Ltd., along with Gerrit Jeelof, member of NV Philips, will chair the conference. Additional information can be obtained from the Financial Times Conference Organization, Minster House, Arthur St., London, EC4R 9AX, U.K.



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CW-10

Fourth Annual PTC Conference To Key on Telecommunications

HONOLULU — The fourth annual Pacific Telecommunications Conference (PTC), which will be held here Jan. 17-20, will involve key policymakers from Pacific Basin nations.

Each of the three days of the program will focus on a different level of telecommunications services: basic services now in operation, services currently being tested and/or developed and services of the near-term and future.

Each day will open with a plenary session featuring a major telecommunications spokesman, followed by the presentation of a case study, a spokesman said. Next, there will be three concurrent sessions for the presentations of papers related to technical and engineering problems; business, user and economic considerations; and social, political and policy issues.

More information is available from PTC 82, Suite 303, 1110 University Ave., Honolulu, Hawaii 96826.

STF Expands Fall Curriculum

BURKE, Va. — Systems Technology Forum, Inc. (STF) has announced an expanded curriculum for its fall seminar. The firm is currently registering applicants for job-related courses in 10 discipline areas of the communications industry. The seminar courses are offered in nine cities.

STF has added three new discipline areas — network management, systems network architecture and local-area networks.

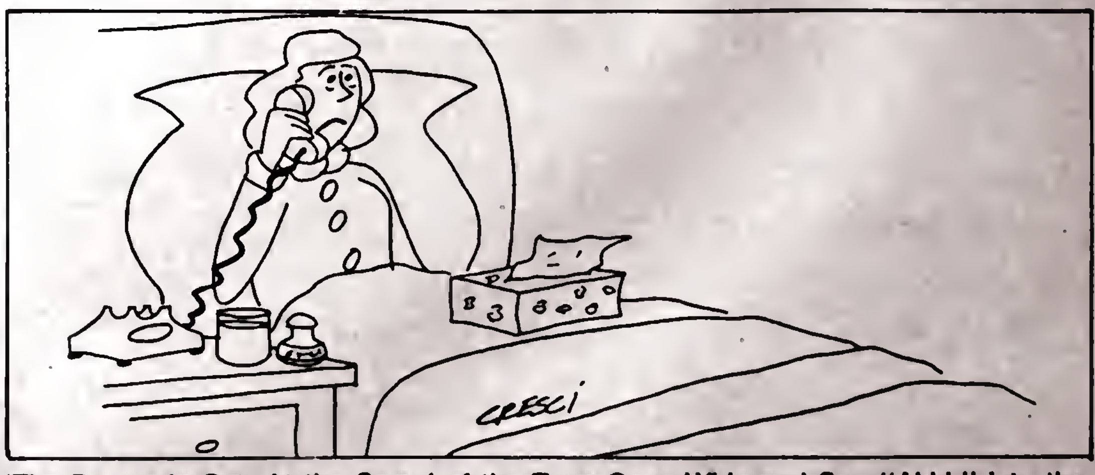
Each seminar generally costs $675 and qualifies for continuing education credits. Requests for schedules and further information should be made to the company at 8991 Cotswold Drive, Burke, Va. 22015.

Directory Lists Calif. Consultants

SAN JOSE, Calif. — A new, free directory listing California consultants has just been published by the Professional and Technical Consultants Association (Patca).

This directory contains the resume of each member and has a cross-referenced index. More than 200 categories of skills are listed including computer hardware, software, applications, engineering, manufacturing, science, writing, business, marketing, management, planning, finance, law and more.

Copies of the text can be obtained by writing Patca, Suite 3, Department RC75, 1190 Lincoln Ave., San Jose, Calif. 95125.



'The Doctor Is Out. At the Sound of the Tone Open Wide and Say "Ahhh" Into the Computer. . .'

More Than 10,000 Patients Per Year

Turnkey Proves Vital Tool for Busy Dentists

By Bill Laberis
CW Staff

GARDEN CITY, N.Y. — Twenty-eight dentists drilling away under the same roof can generate enough of a billing and insurance paper crunch to keep a flock of clerks busy.

And when the dental office is a sort of one-stop dental supermarket catering to more than 10,000 patients per year, manual appointment management alone can consume all the efforts of one or more receptionists.

Recently, the nation's first publicly held dental office here installed a turnkey computer system designed to reduce overhead while helping provide dental services more effectively.

"For the kind of unique service we provide, the system has proven indispensable," Richard Bernstein, president of Dental World Center, Inc., said. "One of the nicest features is that it is as beneficial to the patient directly as it is to us." Bernstein said the nature of the dental center made it difficult and costly for his 2½-year-old organization to operate without a comprehensive computer system to coordinate the work of a 70-member clerical and professional staff.

For one thing, the center wanted to be able to provide one-day service for a variety of dental tasks that required a patient to see four or five different specialists. And the center wanted to be able to tell patients immediately what portion of each specialist's work would be covered by insurance.

Finally, Bernstein said the center's growth necessitated a unified system for coordinating a myriad of clerical chores, from production control of the center's four in-house laboratories to patient billing to personnel payroll.

Turnkey System

After a year's search, the center settled on a turnkey system specially designed for dental facilities by Quality Systems, Inc. of Tuston, Calif.

In addition to custom-designed applications software packages, the system includes a Data General Corp. Nova 3 minicomputer, a 300 line/min printer by Printronix, Inc. and 16 multitask CRT terminals by Hazeltine Corp. as well as software conversion, training and support.

The package cost about $200,000, and Bernstein said the savings the center has realized has been "dramatic," including a paring of his clerical staff by six employees.

The system provides the center with complete management control over billing, insurance, income allocation, on-line scheduling of patients and staff, laboratory production, word processing and a full set of accounting functions as well as special statistical reporting to be used for evaluation and marketing of services.

The entire office has on-line access to current patient information, financial histories and treatment plans outlined by staff dentists.

"With our set-up, a patient will visit the office once instead of four or five times, but he may see several dentists or the same dentist several times in a 10- to 12-hour period," Bernstein said. "The system easily coordinates both our patient and dentists' scheduling."

Bernstein added that the "most important asset" of the system is in the handling of insurance claims, with improved performance now aiding the company's cash flow position as well as patient information services.

Prior to system installation, it took from four to six weeks to verify the extent of a patient's coverage as given by his particular insurance policy — a task now done usually in one day, Bernstein explained. The system is also programmed to automatically fill out a variety of different insurance forms and do so letter-perfectly so that insurance payment is not delayed by claims returned for further documentation.

CICS Course Set for Programmers Experienced in Cobol, PL/I

NEW YORK — A CICS Command Level Course for programmers with experience in Cobol, PL/I or assembler language will be offered here Oct. 19 by Robert Blumfeld, director of education for Sysed, a division of Integrated Computer Software, Inc.

Previous exposure to CICS is not required, according to Sysed, and special attention will be given to basic on-line concepts such as multitasking, pseudo-conversational programming and screen design considerations.

Sysed's "hands-on" training reportedly will challenge students to program and test a data entry/file maintenance system consisting of four programs and a Basic Mapping Support mapset. This system is said to use the features of CICS in a true-to-life design context, according to a spokesman.

The course will be held at Sysed's classroom/computer facilities in New York City. Registration costs $600 per student for the classes and instructional materials, the spokesman said.

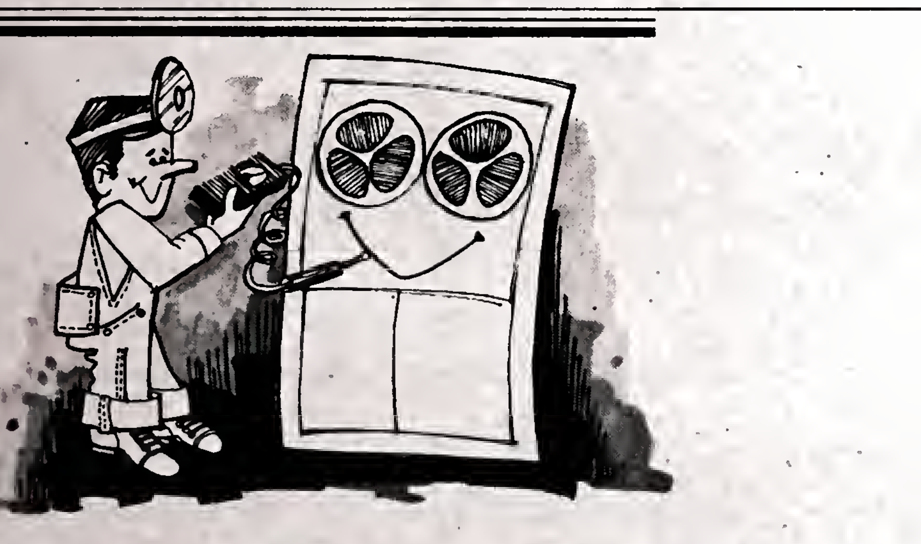
Further information is available from Kenneth Kaplan, Sysed, One Park Ave., New York, N.Y. 10016.

Course to Cover DOS/VSE Vsam

BELLEVUE, Wash. — A four-day training course entitled "DOS/VSE Vsam for Cobol Programmers" has been developed by Software Information Services for presentation at user sites.

The course reportedly covers basic Vsam file structure concepts, master/user catalog usage and Idcams commands, which create and maintain Vsam files. Special attention is given to Vsam data set performance options and the use of the new IBM 3310/3370 Fixed Block Architecture devices, according to Software Information Services.

The course costs $2,900. Software Information Services can be contacted through P.O. Box 4132, Bellevue, Wash. 98009.



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CW-10

Cause Conference Theme: Creativity, Technology

ST. LOUIS — "People: Creativity and Quality with Technology" is the theme of the 1981 Cause National Conference to be held here Dec. 1-4. Cause is short for the Professional Association for Development, Use and Management of Information Systems in Higher Education, the sponsor said.

Six individual track themes will support the conference theme of issues in higher education: decision support systems, managing the information systems resource, the emerging technology, small college information systems, great applications and professional techniques. In addition to the six tracks of concurrent sessions, the conference will include several general sessions and vendor presentations.

Cause '81 will also feature the following three speakers: Arnold Weber, president of the University of Colorado; Niki Scott, nationally syndicated columnist and author of *The Working Woman*; and Daniel Bell, an analyst of social trends who has written widely on aspects of social and cultural theory and general education.

Registration information for this conference can be obtained from the Cause National Office, which is headquartered at 737 29th St., Boulder, Colo. 80303.

Forum to Eye Future Systems

TORONTO — "The Massive Service Centers of the 1980s" is the theme of the Future Systems Forum slated to take place here Nov. 23-24. The event is being cosponsored by Advanced Computer Techniques Corp. (ACT) and Whitsed Publishing Ltd.

Keynoting this forum will be Charles P. Lecht, president of ACT, and Herman Kahn, director of the Hudson Institute, a sponsor spokesman said.

Registration costs $950 and includes lunches and a cocktail party. Further details are available from Patrick Sullivan, Technology Analysis Group, 437 Madison Ave., New York, N.Y. 10022.

Handbook Covers Intercity Links

BOSTON — Economics and Technology, Inc. (ETI) is offering its *Handbook of Intercity Telecommunications Rates and Services*, written to help users select the most efficient and economical telecommunications service between two cities.

Readers can look up the type of service they desire and within that category identify those carriers that provide the service and at what cost. Each carrier service is described in detail, along with lists of locations served, required rate elements and optional services.

Normally priced at $125, the handbook is available for $95 until March 1, ETI said from 101 Tremont St., Boston, Mass. 02108.

Bimonthly Aims At DP Resources

SEATTLE — A new bimonthly publication for computer professionals is being produced by the University of Washington Computing Information Center.

Computing Resources for the Professional contains information about new books, conference proceedings, technical reports and more.

The publication also reports on title changes and other anomalies frequent to serial literature. In addition, it references current articles that are not indexed by any other index or abstracting service.

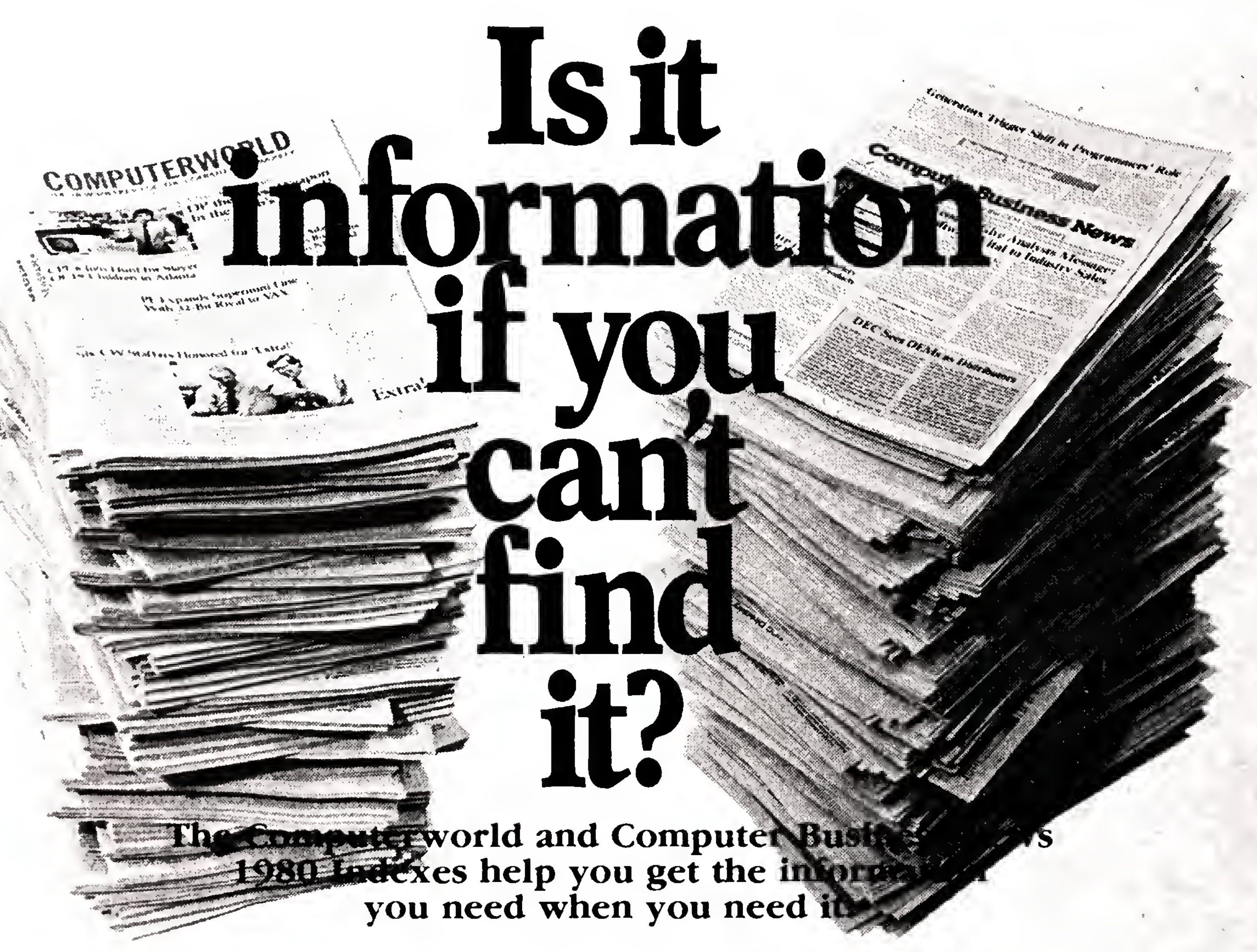
Computing Resources costs $18/year and can be ordered from the University of Washington's Computing Information Center, HG-45, 3737 Brooklyn Ave. N.E., Seattle, Wash., 98105.

Software Directory Offers Discount

POTTSTOWN, Pa. — A prepublication discount of $50 off the full price of the *1982 International Directory of Software* is being offered by CUYB Publications, Inc.

Expected to list more than 4,000 proprietary software products from the U.S. and Europe, the indexed guide presently costs $145 plus shipping. Data is presented in a standardized format showing the purpose, history, terms for acquisition and configuration requirements for each product.

CUYB is located at Suite 401, First Federal Building, Pottstown, Pa. 19464.



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Index	Heading	# Entries
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CBN	DISK EQUIPMENT	67
CBN	MICROCOMPUTERS	85
CBN	GRAPHICS SYSTEMS	88
CW	DATA ENTRY SYSTEMS	30
CW	LITIGATION	62
CW	MAINTENANCE	46
CW	SOFTWARE PACKAGES	50
CW	TAPE EQUIPMENT	57

And that's just a small sample of the type of information you'll find in these two books for just one year! We also have Indexes for *Computerworld* that go all the way back to 1976 (the CBN Index starts with the first appearance of CBN in November, 1978 and runs through the end of 1980).

If you don't have all the back issues of *Computerworld* or *Computer Business News* that you need to get the articles you want, you can order back copies for an entire year on microform from University Microforms at very reasonable rates. Or you can simply take advantage of their individual articles reprint service. (More information is found right in each index.)

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At Hyatt in Cambridge, Mass.

Unix User Group to Meet Dec. 10

STANFORD, Calif. — The Unix user group will be meeting on Dec. 10-11 at the Hyatt Regency in Cambridge, Mass.

The two-day meeting is open to all those interested in Unix. It will include seminars on Unix product technology, marketing perspectives and end-user experiences.

Topics such as "Why Choose Unix," "Unix Licensing" and "Unix Marketing Strategies" will be covered. Space reportedly has been expanded to include more firms in the product display of software and hardware Unix systems.

Registration for members costs $75 before Nov. 18 and $100 thereafter. For nonmembers, advanced registration is available for $100 and the at-the-door price will be $125.

Further information can be obtained by writing to Unix User Group, P.O. Box 8570, Stanford, Calif. 94305.

FIG Convention Slated For Nov. 28 in Calif.

SANTA CLARA, Calif. — The Forth Interest Group (FIG) will hold its national convention here Nov. 28.

The one-day convention will include presentations, workshops, equipment for hands-on experience and a number of vendor exhibits. Dinner will follow the day's activities.

The theme of this year's convention is education related to the Forth language and Forth program applications. Registration for this event is $3, not including dinner. Papers and exhibits are still being accepted by FIG Convention Chairman, P.O. Box 1105, San Carlos, Calif. 94070. .

Tominy Users Set First Meet For Nov. 9-11

CINCINNATI — The first meeting of Horizon, the Tominy, Inc. user group, will be held Nov. 9-11 here.

Focusing on increasing efficient use of Tominy software tools, the conference agenda will include presentations and workshops on programming languages, data base file optimization, application design and implementation and distributing a data base.

Guest speakers include Norman Weiser, corporate vice-president for Federated Department Stores, and Paul Pavloff, corporate director of information resource management at Armco Steel Corp.

Weiser will address business executive concerns regarding distributed vs. centralized processing and Pavloff will present the long-range benefits of effectively managing information resources.

Additional information is available from Tominy at 4152 Crossgate Drive, Cincinnati, Ohio 45236.

Muse to Meet Dec. 6-11 in Fla.

FORT LAUDERDALE, Fla. — The seventh annual Modcomp Users Exchange (Muse) conference will be held here Dec. 6-11.

The meeting will feature technical papers, workshops and user/manufacturer interface sessions on the use of Modular Computer Systems, Inc. computers and software.

The registration fee is $170 for members and $205 for nonmembers, Muse said from Suite 6C, 4620 W. Commercial Blvd., Tamarac, Fla. 33319.

Magazine Bows On Videodisk

MCLEAN, Va. — AIMT, Inc. is offering a magazine entitled *Videodisc/Videotex*.

Published quarterly, the magazine features a directory of videodisk projects, utilization of these technologies and their implications for future delivery systems, publication announcements and reviews, news and notes section and a calendar of events. The magazine costs $52/year from AIMT at Suite 2B, 1311A Dolley Madison Blvd., McLean, Va. 22101.

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DC-2	**Data Communications:** Advanced Concepts and Systems	12/14-15	10/26-27	10/5-6	10/1-2	11/12-13	(D) 11/30-12/1	(H) 12/17-18	9/17-18	
DC-3	**Data Communications:** Effective Network Design	11/4-6	10/19-21	11/16-18	9/9-11				11/30-12-2	
DC-4	**Introduction to Teleprocessing Software**	11/30-12/2	9/21-23	11/4-6	9/14-16				12/7-9	10/14-16
DC-5	**Distributed Systems:** Effective Approaches and Applications	12/9-11	11/4-6	9/14-16	10/21-23	12/16-18			9/23-25	
SS-1	**Information Systems Planning:** A Structured Approach	9/21-23	10/26-28	10/19-21	11/16-18					
SS-2	**Systems Analysis and Design:** Concepts and Effective Practice	11/11-13	10/21-23	9/23-25	9/16-18		(A) 11/30-12/2 (D) 12/9-11		12/16-18	
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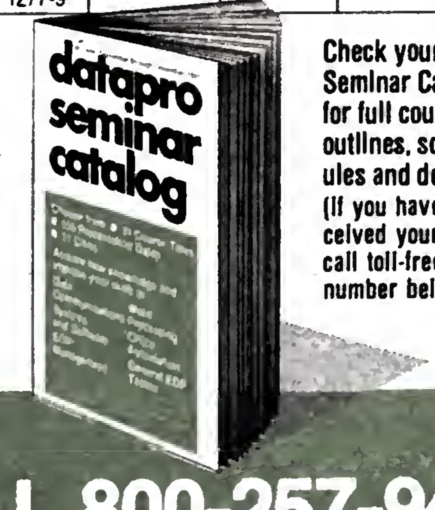
SS-4	NEW **Evaluating and Selecting Computer Software Packages**	11/2-4	10/12-14	11/9-11	12/14-16			(H) 11/30-12/2		
SS-5	NEW **Structured Testing**	11/4-6	9/21-23	10/14-16	12/9-11					
SS-6	**Data Base Management Systems:** Concepts and Guidelines	11/18-20	11/9-11	9/14-16	10/14-16			(H) 12/14-16	9/23-25	
SS-7	**Data Base Management Systems:** A Comparative Analysis	9/23-25	12/14-16	10/14-16	11/18-20		(D) 10/21-23			
SS-8	NEW **Effective Data Base Management**	11/30-12/2	10/19-21	11/16-18	9/21-23		(D) 12/7-9			
EM-1	**EDP Operations Today:** Effective Scheduling and Console Operation	11/9-11	10/26-28	9/23-25	10/12-14					
EM-2	**Effective Computer Operations Management**	9/14-16	9/16-18	10/14-16	10/26-28					12/9-11
EM-3	NEW **Computer Performance Measurement and Capacity Planning**	11/4-6	11/16-18	11/30-12/2	9/30-10/2					
EM-4	**EDP Project Management:** A Practical Approach	9/9-11	10/14-16	9/30-10/2	12/14-16	11/30-12/2				
EM-5	**Advanced EDP Management:** Methods and Techniques in the 80's	9/21-23	10/26-28	11/16-18						
OA-1	**Introduction to Word Processing:** Concepts, Systems and Applications	11/16-18	11/4-6	10/14-16	9/9-11	12/14-16	(A) 12/2-4			
OA-2	**Word Processing:** Effective Operations Management	9/21-23	10/14-16	11/16-18	12/14-16			(D) 11/11-13		
OA-3	**Integration of Word Processing and EDP Systems**	12/2-4	11/11-13	11/4-6	9/14-16		(D) 12/14-16		10/14-16	
OA-4	NEW **Planning for Office Automation:** Concepts and Practices	10/26-28	9/23-25	12/14-16	12/2-4			(H) 11/11-13		
G-1	**Data Processing:** An Introduction to Concepts and Systems	12/16-18	9/23-25	11/4-6	9/16-18	11/30-12/2	(A) 10/26-28			
G-2	**Minicomputer Systems:** Guidelines for Successful Selection, Acquisition and Operation	10/21-23	9/21-23	9/14-16	11/30-12/2	12/7-9				
G-3	NEW **Basic:** An Introduction to Computer Programming for Managers	11/11-13	12/9-11							
G-4	NEW **Intro to Micro/Personal Computers:** Application, Selection and Usage Guidelines	10/26-28	10/12-14	12/14-16						
G-5	**Using PASCAL/ADA for Increased Programming Efficiency**	9/21-23	11/16-18	10/26-28	12/7-9					
G-6	**Using Computer Graphics:** Techniques, Systems and Applications	11/30-12/2	11/16-18	11/4-6	10/19-21					
G-7	**Effective Oral Presentation Techniques for DP Professionals**	9/21-23	10/19-21	10/26-28	11/16-18					
MB-1	NEW **Accessing and Utilizing Public Data Bases**	11/9	12/14	11/2	10/19					
MB-2	NEW **Local Networks**	11/10	12/15	11/3	10/20					



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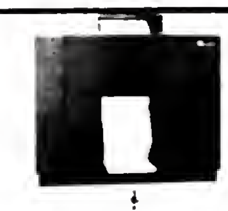

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Call for Papers

1982 OFFICE AUTOMATION CONFERENCE, San Francisco, April 5-7, 1982.

The theme for this conference is "The Human Connection" and papers are being sought in each of the following five areas: individual issues, which will focus on the concerns of the individual users; organization and management concerns; user interface and usability, which deals with ergonomic issues; communications and systems technology update, which concentrates on what is new in networking, distributed intelligence and so on; and integration issues and case studies, which look at hardware, software, networks and procedures for the more effective automated office.

Written abstracts are due Oct. 15 to Diane Shedron, Program Committee Secretary, Hewlett-Packard Co., Building 43G, 18420 Homestead Road, Cupertino, Calif. 95014. Notification of acceptance will occur by Dec. 15 and further details are available at the above address.

VIDEOTEX 82, New York City, June 28-30, 1982.

Topics for this event include the following: videotex in the home, electronic mail and funds transfer, electronic publishing, advertising through videotex, transactional videotex, teleshopping and direct marketing, in-company information systems, applications in specific fields (travel, retail, newspapers, finance, government), case studies, educational applications, systems justification and costing, user groups, internationally based systems, regulatory and legal issues, network structure, related developments, market development projections and videotex terminal design.

Papers will be printed in book form. To submit a paper, authors are asked to submit short summaries, along with biographies, no later than Nov. 11 to Paula Stockham, Videotex 82, On-Line Conferences Ltd., Argyle House, Northwood Hills, HA6 1TS, Middlesex, England. Rough drafts are due by Dec. 31 and notification of acceptance will occur in mid-February.

CAD/CAM GRAPHICS EXPO, Reno, Nevada, Oct. 26-29, 1982.

A call for papers has been issued in the areas of electronic design and manufacturing; mechanical design and manufacturing; numerical control; factory facilities and warehouse design; construction and architectural engineering; mining, mapping, and geological engineering; and process control application.

Prospective authors are asked to submit abstracts (300 to 400 words) by March 1. Also, a short abstract, to be used for promotional purposes of not more than 50 words should accompany the longer abstract. Author's guidelines will be sent upon notification of acceptance.

Abstracts should be sent to CAM International, Inc., Meetings and Expositions, Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

TWELFTH CONFERENCE ON COMPUTER AUDIT, CONTROL AND SECURITY, New York City, April 19-23, 1982.

The EDP Auditors Foundation, in conjunction with the Automated Training Center, Inc., is seeking papers on how to use SMF logs; installing an integrated test facility; audit, control and security of small installations with sophisticated systems; audit tools for non-IBM systems; operational audits; the one-person DP audit shop; auditing the DOS operating system; and auditing data base systems.

One-page abstracts, along with a resume and business telephone number, are due by Oct. 26 to Harold Weiss, Program Chairman, Automated Training Center, Inc., Suite 17, 11250 Roger Bacon Drive, Reston, Va. 22090.

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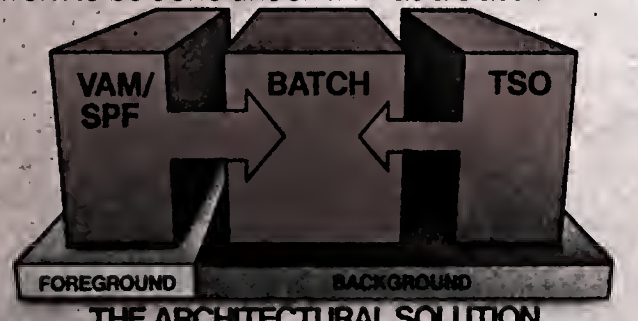

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Calendar

Nov. 3-6, San Antonio, Texas — **Structured Requirements Definition.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. Eighth, Topeka, Kan. 66607.

Nov. 3-6, Boston — **Structured Program Design.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. Eighth, Topeka, Kan. 66607.

Nov. 4, Toronto — **Stradis.** Contact: George Blatt, Department K277, Box 516, St. Louis, Mo. 63166.

Nov. 4, Boston — **Paperwork Reduction Act Implementation.** Contact: James N. Ridgell, 1774 Poplarwood Court, Concord, Calif. 94521. Also being held Nov. 5 in Philadelphia and Nov. 6, Atlanta.

Nov. 4-5, Providence, R.I. — **Telemarketing.** Contact: The Center for Management Development, Bryant College, Smithfield, R.I. 02917.

Nov. 4-6, New York — **Data Communications Fundamentals.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Nov. 4-6, Raleigh, N.C. — **Screen Design.** Contact: Priscilla Goudreault, Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Nov. 4-6, Washington, D.C. — **Fundamentals of Data Processing for the Non-Data Processing Executive.** Contact: Information Services, 20th Floor, University Conference Center, 360 Lexington Ave., New York, N.Y. 10017.

Nov. 4-6, Philadelphia — **Screen Design.** Contact: Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Nov. 4-6, Atlanta — **Electronic Office Systems, Evolution or Revolution?** Contact: Ronni Marshak, Seybold Consultant Group, Suite 801, 44 Bromfield St., Boston, Mass. 02108.

Nov. 4-6, Los Angeles — **Applied Interactive Computer Graphics.** Contact: Marc Rosenberg, UCLA Extension Short Course Program Office, 6266 Boelter Hall, UCLA, Los Angeles, Calif. 90024.

Nov 4-6, Clearwater, Fla. — **SAS Regression & Anova Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 5-6, Anaheim, Calif. — **Software Quality Assurance and Verification and Validation.** Contact: EFDPMA Seminars, Department SQA, Suite 1016, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Nov. 5-6, Houston — **EDP Finance and Contacts.** Contact: 20th Century Systems, Inc., 647 E. Carpenter Drive, Palatine, Ill. 60067.

Nov. 5-8, Los Angeles — **USUS.** Contact: Chip Chapin, USUS Secretary, P.O. Box 1148, La Jolla, Calif. 92037.

Nov. 5-6, Washington, D.C. — **Magnetic Tape Library.** Contact: Patricia Rizziello, Tape Library Consulting, 3 Rock Royal Road, Yardville, N.J. 08620.

Nov. 5-6, Washington, D.C. — **Seminar II. Telecommunications Technologies, Opportunities and Strategies for Senior Management.** Contact: Telestrategies, Suite 102, 6842 Elm St., McLean, Va. 22101.

Nov. 5-6, San Francisco — **The Writing System for the EDP Professional.** Contact: Director of On-Site Programs, Carnegie Press, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Nov. 6, Hartford, Conn. — **The Art of Negotiating.** Contact: Negotiation Institute, Inc., 230 Park Ave., New York, N.Y. 10169.

Nov. 8-10, Danvers, Mass. — **Automated Office of Tomorrow.** Contact: Richard D. Murray, Director of Conferences, Institute for Graphic Communications, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

Nov. 8-11, San Diego — **American Electronics Association Human Resources Symposium.** Contact: AEA, 2680 Hanover St., Palo Alto, Calif. 94304.

Nov. 9-10, New York — **International Trade Expanding Markets ... Expanding Profits.** — Contact: Interforum Group, Inc., 68 William St., New York, N.Y. 10005.

Nov. 9-10, Boston — **Computer/Micrographics Interface.** Contact: Registrar, Battelle Seminars and Studies Program, 4000 N.E. 41st St., Seattle, Wash. 98105.

Nov. 9-10, St. Louis — **Software Fair.** Contact: Nida/Sida Management Methods Committee, 1900 Arch St., Philadelphia, Pa. 19103.

Nov. 9-10, Chicago — **User**

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Documentation. Contact: Palmer House, 17 E. Monroe St., Chicago, Ill. 60690.

Nov. 9-10, Dedham, Mass. — **Facilitator Training (Part One).** Contact: QWL Institute, Suite 301, 30 Church St., Belmont, Mass. 02178.

Nov. 8-10, Milwaukee — **Effective Use of CAD/CAM Systems.** Contact: John M. Leaman, Department of Engineering & Applied Science, University of Wisconsin-Extension 920 N. Sixth St., Milwaukee, Wisc. 53203.

Nov. 9-11, Los Angeles — **ACM '81.** Contact Conference Information, P.O. Box 24059, Village Station, Los Angeles, Calif. 90024.

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EDITORIAL

Order in the Ranks

IBM's recent reorganization into three large groups is the latest embodiment of the firm's age-old dedication to progress, to the future and to being No. 1.

When Thomas J. Watson Sr. took the reins at the foundering Computing-Tabulating-Recording Co. — later to become IBM Corp. — back in 1914, his goal was to fairly and imaginatively take advantage of the private enterprise system to better himself, his workers and the world.

With courage and panache, Watson instituted such attractive company offerings as employee educational programs, country clubs, gala celebrations and a paternalistic umbrella that effectively squelched any nascent desire for unions.

Besides continually pushing IBM's best technological minds to the leading edge of innovation, Watson was well-known for his aggressive sales techniques, many of which he learned during his early days as a salesman for the National Cash Register Co.

One of those NCR-inspired techniques was to give each salesman an exclusive territory in an effort to eliminate competition among several salesmen for the same customers. Under the plan, if Salesman B sold a product in Salesman A's territory, it was Salesman A who would get the commission.

While IBM no longer features the pageantry of its early years, its latest move can be seen as a reflection of its enduring concern for harmony among the various parts of its internal structure.

Industry analysts have conjectured that IBM's new reorganization amounts to an acknowledgment that competition among divisions for sales to the same customer has been a mounting concern as customers expand their use of computers.

Furthermore, IBM President and Chief Executive John Opel said the reorganization was initiated "to put IBM in a position to take advantage of tremendous growth opportunities in our business."

In short, IBM — as always — wants to keep order in the ranks while addressing the demands of progress, the future and being No. 1.

DATA PAST

Five Years Ago
Oct. 11, 1976

SAN FRANCISCO — Itel Corp. unveiled a large CPU described as "100% hardware and software plug-compatible" with the IBM 370/158. Called the Advanced System/5, the Itel machine was said to operate with existing IBM software and provide some hardware features not available on the Model 158.

— — —

WASHINGTON, D.C. — The White House Office of Telecommunications Policy (OTP) might be trying to influence the Justice Department's antitrust suit against AT&T, according to Rep. Timothy Wirth (D-Colo.). Wirth cautioned OTP Director Thomas Houser about public statements made concerning that suit. Houser had issued a statement in late August questioning whether the Justice Department suit had been adequately researched, especially in the area of economic justification.

Ten Years Ago
Oct. 6, 1971

NEW YORK — As far as software, systems support and maintenance went, RCA users were told they would have to fend for themselves after the expiration of current contracts. That was the bomb dropped by RCA Chairman Robert W. Sarnoff. Computer maintenance had been performed by the computer division for the preceding two years.

— — —

WASHINGTON, D.C. — The Achilles' heel of the computer industry is software and the technological supporting system, Dr. Ruth M. Davis, director of the National Bureau of Standard's Center for Computer Sciences and Technology, told a House subcommittee here. "At this moment," she said, "such supporting systems and software have become the Achilles' heel in all our attempts to channel the power of computers to serve our best interests."

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JIM ORTON
computerworld

LETTERS

Orwellian Implications

Much attention is focused on Senate Bill S. 898, which proposes that AT&T be allowed to form a subsidiary to offer services for the storage and transmission of electronic information. This is Orwellian in its implications.

AT&T has the resources, power and potential to control massive amounts of information about individuals, businesses and government and to in fact manipulate their individual and collective destinies with these immeasurable resources. AT&T has the resources to eliminate competition as easily and with as much impunity as a person would swat a fly.

The incursion of AT&T into the information marketplace represents a seriously detrimental trend. To paraphrase Rep. Tom Kindness' (Eighth District, Ohio) comments on the federal government: An AT&T that is big enough to give us all of our information is big enough to take it away.

The most vibrant element of the free enterprise system is the data processing services industry. To allow a government-created and regulated monopoly to invade this free enterprise territory is less than unreasonable on the face of it; when studied closely, it is dangerous.

Jeffrey Reeves
Chairman of the Board
Chief Executive Officer
Convey Companies, Inc.
Dayton, Ohio

Where Ada Fits

Werner Frank's article "Why Another Language?" [CW, Sept. 21] did not answer its own question and only contributed to the plethora of misleading literature about Ada.

Ada was originally conceived as a language for programming embedded computer systems. The constraints imposed by this design objective limit Ada's usefulness to much of the computer user community.

Generally, embedded computer systems must run on a host of processors, from large mainframes to microcomputers. In these systems, the instruction set, word length and other details vary from processor to processor in the system. Ada provides a means for these details to be included as part of the language processor (its compilers) rather than the language itself. The designers wanted to increase program portability and replace assembler-level programming effort with high-level programming effort.

This approach extends the usefulness of Ada, but only slightly. Ada is suitable for writing compilers, operating systems and other system software. Ada statements can conveniently specify a machine's logical operation. Its value in hardware development and system software is not disputed.

Ada has little to offer the average applications programmer, however. He gains little more than a better language for writing structured programs. This is important, but not important enough to convince most users to give up their investment in their present languages.

Organizations that write programs primarily in high-level languages need to recognize that Ada does little to improve their lot. These users will benefit most from a language at least one level higher.

If the computer industry can limit Ada's application to its logical uses — hardware development and systems software — it will fulfill the claims made by its advocates. If not, Ada might be perceived as the boondoggle language of the '80s.

Jim Ingram
DP Standards Coordinator
Durham Life Insurance Co.
Raleigh, N.C.

READER COMMENTARY/Frank C. Fillmore Jr.

Certification More Important Than Ever

Jobs in computer-related fields far outnumber the available pool of qualified candidates, driving up salaries and enhancing benefits. Trade schools, community colleges and universities are all experiencing a boom in DP curricula. Both the public and private sectors of our economy are sorely dependent on specialized management information systems (MIS) personnel and continue to become more so. The only wrinkle in this reverie is the feeling that "fat city" for DPers won't last forever.

The omens are ominous: user-friendly software on the market allows managers with virtually no data processing skills to access files and data bases through terminals using English-like commands. Classified ads require applicants in such diverse fields as accounting, marketing, management and sales to have prior experience or college-level training in programming languages. Smaller businesses are turning to minis and micros with the aid of packaged software and easy-to-understand how-to books.

More User Freedom

In the face of this, a user who once had few alternatives if denied programmers and analysts for a project may soon be able to respond to the uncooperative DP manager, "I'll do it myself!" When that day comes, highly specialized and narrowly based DP skills will be a liability instead of the asset they are now. For these reasons, I must speak in favor of the certification of DP professionals.

Notice that I used "professionals" only after the word "certification" and with good reason — data processing is *not* a recognized profession. The Department of Labor stipulates that a "professional" must use independent judgment to further the goals of his employer, not merely follow a predetermined routine. Data entry clerks and, for the most part, computer operators do the latter.

In the range from programmer to systems analyst, it becomes nearly impossible to determine the characteristics of both an employee and his appointed tasks to classify them as professional, except on a case-by-case basis. This case-by-case classification is precisely what the Institute for the Certification of Computer Professionals (ICCP) does.

> *'To cries of "Elitism!" coming from some reading this article, I would respond that there will always be positions for people in DP who do not wish to pursue a professional career, but prefer coding and elementary design work. In accounting there are bookkeepers, in the legal profession there are paralegals. There must be some way to make the same distinction in DP.'*

A nonprofit organization supported by most of the major DP associations and fraternities, the ICCP annually gives its Certified Data Processor (CDP) examination. This test is not limited to technical DP questions, but deals more broadly with the professional as part of a larger organization, the interests of which must take precedence over parochial DP matters. The CDP exam is the ideal tool for codifying and standardizing minimum data processing and related knowledge for the professional, much the same as the Certified Public Accountant (CPA) exam establishes the credentials of accounting professionals.

All of this is not intended as a shill for either the ICCP or CDP; my purpose is to point out the benefits to all in DP fields as well as employers in supporting the CDP. The DP shops of the future will probably need fewer, more highly trained employees to meet an organization's needs. The CDP designation will aid personnel departments that cannot determine the competence of individual job candidates. The CDP will also enable employers to more fairly judge between candidates with a lot of job experience, but little formal education and vice versa. Organizations would also be more comfortable hiring independents and consultants if they could depend on ICCP certification for screening purposes.

In addition to technical standards, the ICCP is formulating a code of ethical conduct that will be of much benefit to both CDP holders and the community at large. With the continued growth of personal computing, some means will be necessary for any person with computer problems to select with confidence someone to provide professional assistance.

To cries of "Elitism!" coming from some reading this article, I would respond that there will always be positions for people in DP who do not wish to pursue a professional career, but prefer coding and elementary design work. In accounting there are bookkeepers, in the legal profession there are paralegals. There must be some way to make the same distinction in DP.

Furthermore, there are inherent dangers in proceeding with the status quo of lumping everyone in DP together. In many instances, DP workers are members of white-collar clerical unions by law; this harkens back to the Department of Labor dilemma: There is no set of standard and accepted data processing practices by which the Department of Labor can designate DPers as professionals. Generally, programmers and analysts have little in common with the rest of a union's membership. Indeed, what correlation is there between the collective bargaining concerns of an organization's clerical staff and computer center staff?

In addition, since the DP staff is always a small minority of a union's membership, it is likely that DPers' unique problems will be given short shrift. This is not an antiunion polemic. In the case of programmers and analysts, since they are usually at the high end of a union membership's pay scale, there is little a union can offer. The Association of Certified Data Processors and similar groups would be a more appropriate place to forward the aims and meet the concerns of professional DPers.

In summary, I must point out the chicken-and-egg conflict in this matter. The CDP must be widely recognized by employers and the public to be attractive to DPers, but no one will ever hear of the CDP if it is not broadly supported by those in DP. We must break the inertia.

Fillmore is a programmer/analyst with Hutzler's in Baltimore, Md.

HUMAN CONNECTION/Jack Stone

'Time Sharing' Lets DPer Juggle Job, Marriage

With the ever-increasing number of wives entering the ranks of DP professionals, I have sometimes wondered how their husbands felt about and dealt with their successes — and failures. With no intention of embarking into a diatribe on the subject of male chauvinism, I must nevertheless note that many men suffer negative feelings when their spouses become wage earners or, worse yet, bread winners.

Psychologists suggest that such reactions result in large measure because nowadays men in such circumstances perceive themselves to be in a subservient role, a situation difficult for them to accept after nearly two centuries of an American tradition of male domination. And, depending on personalities, attitudes and interests of the spouses — plus how wild the kids are — the husband's antagonism can result in the outbreak of marital hostilities.

I interviewed Doris Goldman, an independent software vendor operating out of St. Louis, and her husband, Melvin, a physician, for their views on this subject.

As professionals, you both surely must spend a great deal of your off-hours in independent study, writing papers, traveling and so on. How do you arrange your schedules so that you can have a continuous relationship?

Doris: It's really easy now. It was a lot tougher while our four children were growing up, because we wanted to spend considerable time helping them to develop and mature. I keep thinking that we made a significant contribution to their growth and that we are a loving family, except that they all left town to seek their fortunes. So we cling to a fantasy wherein my son, also a software systems entrepreneur, returns to take over my business, and my middle daughter, a physician, comes back to handle Melvin's practice as he phases into retirement.

Melvin: Also, we have certain common professional interests. Doris, for example, markets medical office systems and frequently asks for my consulting assistance. She has installed a system in my office and has automated much of my administrative processing and billing, so I ask her for advice in the area of systems and procedures. For one reason or another, most doctors in individual private practices have chosen not to computerize their offices and I probably would have avoided computers as well, had not Doris spent the time training me. Now, I don't see how I survived without one.

Doris: As a sole proprietor, I schedule my time to travel with Melvin to his meetings and take part in the activities planned for the wives. It took some getting used to for Mel as he traveled with me to my symposia and had to attend the flower shows and the theatre matinees for the spouses. I'm not sure he ever recovered from one seminar where, through a programming error, a computerized nametag labeled him as "Mrs. Melvin Goldman."

Surely, your relationship is not euphoric all the time. What are some of the things that bother you?

Melvin: The telephones, for one. They are both a boon and a bane. With our answering machines, we can easily pass messages to each other, any time of day or night. They also allow certain clients to contact us who need "hand-holding," and we seem to spend an inordinate amount of time on the phone and away from each other. But we have long recognized that both medical patients and end users of computing equipment need continual reassurance to help maintain their confidence. We have also learned that a major part of our time must be spent providing the responsive, sincere communications that clients deserve.

Doris: What's more, both of our client groups know when doctors — and computer consultants — are feigning sincerity, because they tell us so. So we try harder to share our time with others, both because this sharing is part of our responsibilities and because the process has helped build our own relationship.

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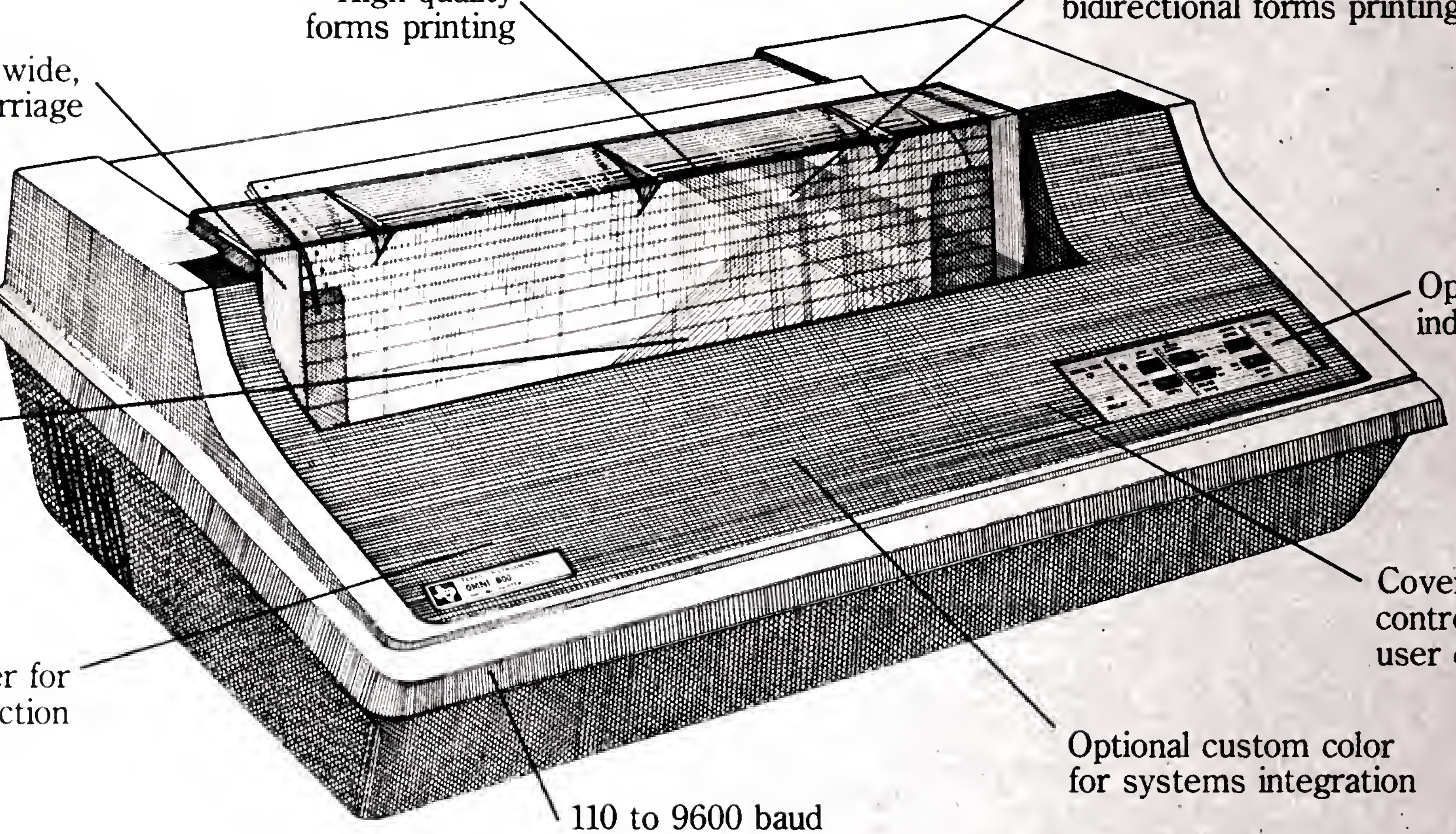
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TEXAS INSTRUMENTS
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LETTERS

Coding Errors

Although the letters pointing out errors in "Alternatives to Cobol" [*Computerworld Extra!*, Sept. 1] contained relevant information, each one was misleading because of errors of its own.

The PL/I IF statement does not require parentheses around the condition.

The SELECT (labeled CASE) statement is supported by the IBM "Optimizing" and Checkout compilers, but is not part of the current American National Standards Institute (Ansi) standard. Further, the examples given by William M. Geimer [CW, Sept. 14] are syntactically incorrect (each is missing "END,") and the nesting level limit of 49 is not a characteristic of the language, but an implementation restriction of his particular compiler.

The comments by Gabriel Goldberg on STATIC vs. AUTOMATIC storage [CW, Sept. 21] are valid for PL/I (F), which is obsolete and unsupported. For the OS/VS "Optimizing" compiler, AUTOMATIC Storage allocation does not require a call to a library routine: It is acquired from the ISA at the same time as the DSA (Dynamic Save Area). STATIC storage is more efficient only for variables with an INITIAL attribute (initial value), but should not be used other than for constants if the program is to be reentrant (shared).

Seymour J. Metz
Senior Systems Programmer
Product Development and
Systems Programming
Computer Network Corp.
Washington, D.C.

DBMS at Yale

It is getting harder and harder to understand the articles in *Computerworld* that discuss data base management systems (DBMS), productivity and structured programs. The concepts aren't that hard, but about the only person willing to say so is Daniel McCracken [*Computerworld Extra!*, Sept. 1]. I believe that CW is becoming the vehicle for a conceptual turf war of declining interest to people who are doing the things CW writers discuss in terms of feasibility. In some cases, people have been practicing the concepts for a decade.

In 1971 we began the design of a student record program for Yale University (a notoriously messy application because the requirements change constantly) and took advantage of the fact that universities could then get a Unix license from Western Electric Co. for about $25.

The unit data record — everything about one student — was internally structured and data items were referred to by an explicit Dewey Decimal line/field number. The record was therefore completely extensible and has in fact been extended to include financial records and so on. No relationships between data fields were expressed or implied in the design. If that makes the data base relational, it is.

One of the rules was that nothing passed from one program module to another but data, either raw or in some known intermediate file form. If that makes the programming structured, it is.

Another of the rules was that no temporal data files were permitted to outlast a production run. All new data was entered in the unit data files and processed in a forward stream thereafter. No data item was included in the data base more than once. A two-page data file format and a 12-page codebook describing the field contents were the total documentation for a data set with more than 300 variables per case. If that is a data dictionary, we had it.

The only piece of code that is in any way unique is the one that understands the structure of the Dewey Decimal number used in data files and goes to fetch/input the field contents specified from/to the files requested. It also handles file locks against simultaneous update and similar housekeeping chores. It is about 600 lines long. I am unable to determine from present writings whether it is a file management system or a DBMS, but we had it.

(Continued on Page 64)

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MARTIN MARIETTA DATA SYSTEMS

LETTERS

(Continued from Page 63)

Insofar as possible, every application was first prototyped using the rich array of standard utility programs Unix provided. One got the needed data fields from the needed student files and strung the data belonging to one student out in a structured line of indefinite length. A file full of these lines was calculated using the Deskcalc program, sorted by data value on some field(s), split, formatted and printed.

If it was what the registrar wanted and didn't take long or get used often, we left it alone. If it took a long time and was used often, a special program was written to do it faster, using the utilities as subroutines where convenient. If this is prototyping and end-user involvement a la McCracken, that's what we did.

The whole works took about 24 months using three sophomores from the computer science department as programmer/analysts and a very bright member of the faculty as consultant. The programming cost was under $20,000 for about 6,000 lines of code. Undergraduate programmers in those days got about $8 per hour on average, so it works out to something under one and one-half man-years of programmer time.

It has probably had that much again spent on new functions, whistles and gongs. It runs bigger and faster, but no differently, and nothing has ever had to be rewritten because something else was added.

It was relatively straightforward because Unix, far more than any other operating system then or now, is modular. Outside the kernel, it consists of a big bundle of transfer functions that are fully defined when you have been told the expected form of the input, the internal transfer expression and the form of the output. The functions couldn't care less, in most cases, whether you feed them data or code. If you feed them the wrong thing, they produce garbage or blow up, and that is that.

It wasn't a very popular scheme a decade ago, because Unix was designed to take full advantage of the Digital Equipment Corp. bus structure and DEC was the only one who had it. Now everybody does, or something like it, and there are Unixes for other vendors' machines.

Is the whole world slowly struggling toward our simple-minded model in which the only entries you had to worry about were data strings, transfer functions ("applications programs") and pipes to send the result somewhere or am I missing something big going on? I'm told there is an effort afoot to move the application onto Nomad on the central IBM 370, but there is a backlog of work . . .

J.H. Hoskins
Publisher
The Practice Letter
New Haven, Conn.

Cobol Bigot

I must admit that I am a Cobol bigot and believe that Cobol control structures are more than adequate. They just must be used properly.

Thus, the example of the Cobol case given by Peter van der Linden in "Alternatives to Cobol: Ada" [*Computerworld Extra!*, Sept. 1] really hurt my soul. The example is not only poorly indented, but uses completely superfluous "GOTO" statements.

Since 1975 my shop has been practicing the techniques illustrated in a CW article that espoused the principle of the "structured period" as well as an "indentation strategy" which results in the following clear implementation of a CASE statement:

```
process-code.
  IF   code = 'a'
         PERFORM process-a-code
  ELSE IF code = 'b' OR 'c'
         PERFORM process-bc-code
  ELSE IF code = 'd'
         PERFORM process-d-code
  ELSE
         PERFORM  process-unknown-
code
```

Note that the "flow" of the case is quite clear. Also note that the "." (or Cobol "end-if" statement) is on a line by itself, in column 12. This one easy-to-use rule, which completely eliminates the "missing or extra period" syndrome, has reduced "logic" errors in my shop significantly.

I suggest that a reprint of that article might be in order. Implementation of the suggested techniques has been painless and the return has far exceeded the cost of our CW subscriptions since. I encourage all Cobol programmers to "try it, you'll like it."

Steve Ryder
Manager,
Software Support
Management Information
Center
Texas Education Agency
Austin, Texas

Surprised

Computerworld's general tone seems to encourage creative thinking and an interest in the "human factor" in the world of computers.

Therefore, I was surprised to read Larry Long's answer to the DP graduate who is seeking a programming position in the music industry, [Turnaround Time, Aug. 31].

What could be more useful than a programmer who already agrees with corporate interests and has a knowledge of the subject matter with which he must deal?

It is true that this person is limiting his opportunities, but it is also apparent that this person has a clear idea of where to best fit in the world. As long as there are any such jobs available, why not shoot for the top? There will always be time later to settle for less.

On another subject, I would like to see in CW more coverage of the computer community in the federal government.

Thank you for listening.

Teresa A. Spencer
Bozeman, Mont.

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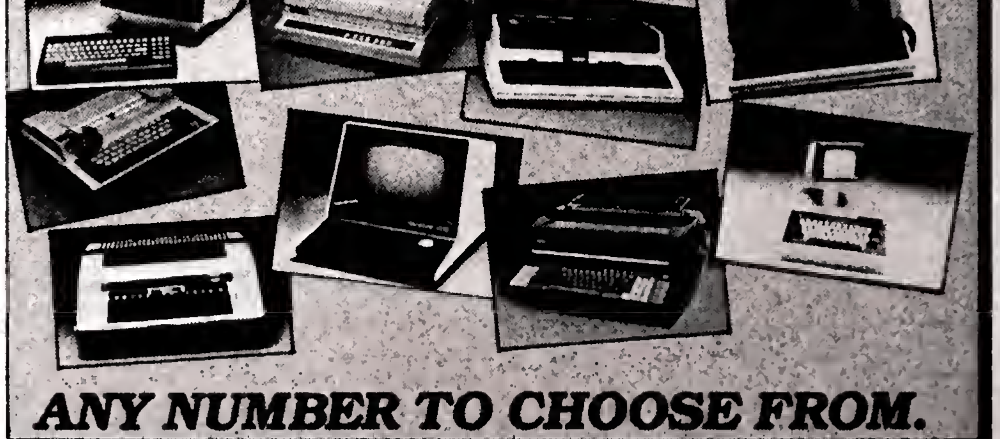

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LETTERS

Worth the Price

I was heartened to read Jack Stone's Sept. 21 column regarding the narrow scope of evaluation used by DP management in the hiring of professional staff.

I am a former DP professional now working as a DP recruiter (I won't wince at the term "headhunter"). Recruiting firms, such as my own, serve a vital need: Not only do we recruit DP professionals in general, but we specifically recruit according to the client's needs. The "problem DPer" referenced in Stone's column would not be considered a marketable candidate by any reputable search firm. Furthermore, any agency worth its salt meticulously checks references of potential candidates.

DP managers complain vociferously about the "outrageous" fees charged by agencies, but don't realize that by utilizing an agency, they will avoid hiring people such as the one referred to in the article. If the lines of communication between myself and a DP manager are open and specific as to needs, my fee will be well-earned.

Karen Sampson
Positions, Inc.
Providence, R.I.

Personnel 'Roots'

This "fairy tale" was inspired by the Human Connection column "Problem DPer Blames Personnel" [CW, Sept. 21]:

Once upon a time there was a group of people who had a very serious problem. While they appeared to be fairly normal physically, talked well, dressed properly and went to the right schools, they had problems.

They were not mechanical, nor artistic, nor creative nor analytical. They were born without the facilities to perform simple tasks. However, they could and did have opinions.

Since they couldn't do anything, they were in constant trouble with the limited choice of what they could have opinions about. They wound up having opinions only about themselves and each other.

One very bright and clear day, they suddenly became aware that there were other people around who were actually doing things! What these tasks were and what purposes they had were incomprehensible to them, but, the group opined, "What a superbly fertile field for opinions!"

And so, being people opinion-ori ented, the group started to develop an opinionating science which, for want of a better name, was labeled "personal services."

They convinced institutions of higher learning that the world was crying for people opinions. However, the group had to change the name of this new thing because it sounded too intimate to the world of educational objectivity. And so, in a burst of pure genius, was born the inspiring derivative "personnel services."

This group lives on, convincing the world that people opinions are the only accurate fitness measures.

(Name Withheld by Request)

Basics of Planning

"Levi Strauss Pioneers DP Planning Strategy" [CW, Sept. 14] made some important points about the necessity of integrating the DP effort into the overall corporate plan consistent with most strategic planning. Apparently Levi Strauss has made a significant corporate effort to support the DP planning task.

However, numerous other organizations in name or in practice use the same basic tenets of DP planning. In fact, as many independent consultants (and some internal DPers) realize, a key determinant in the ultimate success level of a given installation may well be the degree to which corporate management embraces the concepts discussed in the Levi Strauss article. Those who fail to engage in such planning may find that their DP effort seems to be happening around them, that they have little control.

Clearly, the effective DP department cannot function in a high-technology vacuum. It must interface with both the user departments and top management to make certain that specific organizational goals are met.

Steven D. Sass
Vice-President
Management Systems
Advanced Resource Development Corp.
Columbia, Md.

Talent Search

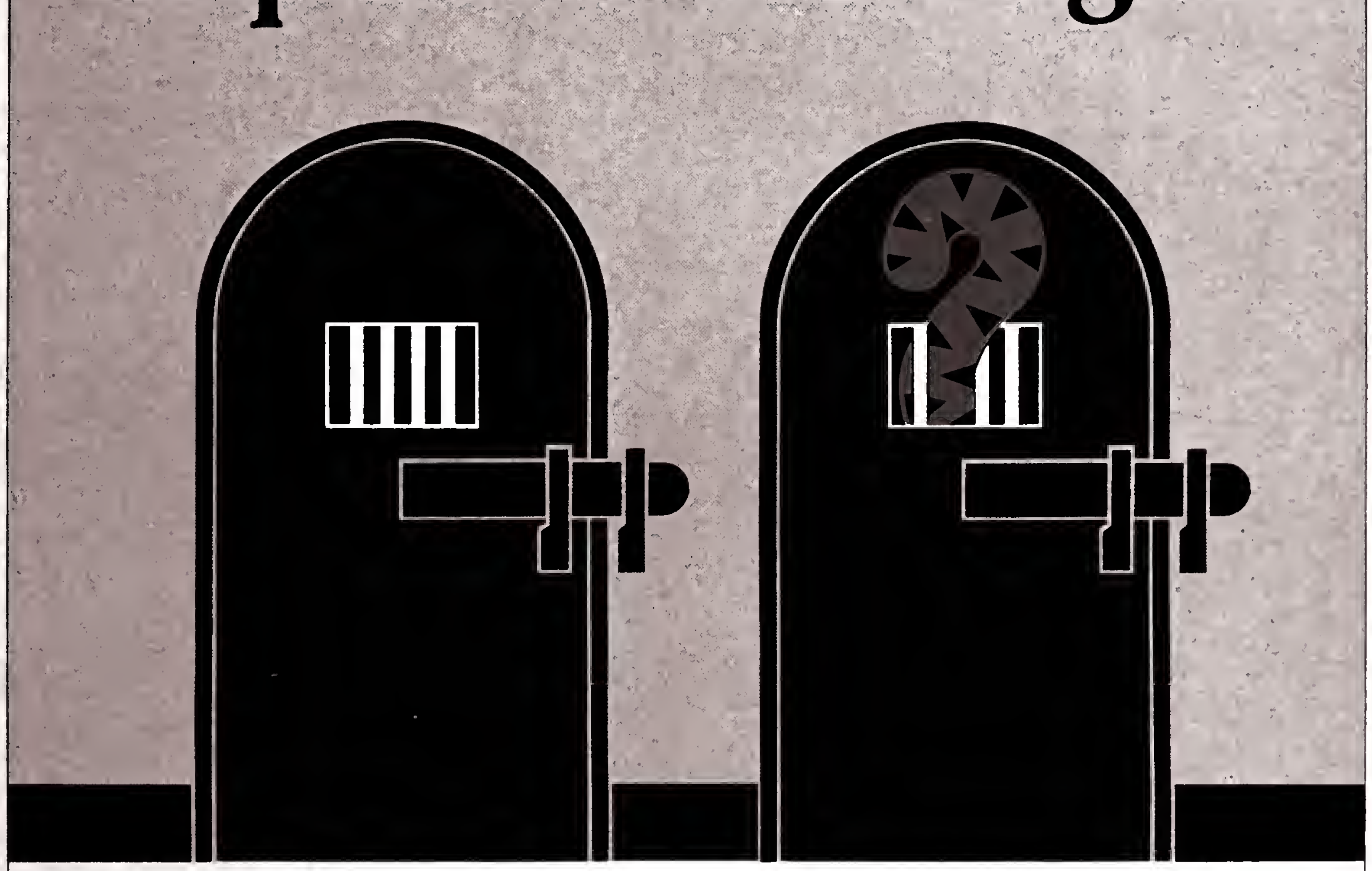
I have been reading the various opinions concerning the issue of importing foreigners to fill domestic data processing positions and would like to add my own:

There is a very definite shortage of qualified DP personnel in this country. Since our educational system seems hard-pressed to keep up with the demand, it seems that the responsibilities of identifying and educating a suitable work force must necessarily fall on the shoulders of the business community.

The predominant "next-quarter-profitability" thinking usually applied in this type of situation should be shelved in favor of developing some real long-term educational and career planning. With proper planning and some government backing (in the form of tax incentives), I believe quite a pool of available talent can be unearthed from within the ranks of any major corporation.

Richard G. Trachtenberg
New York, N.Y.

The right decision often requires a little insight.



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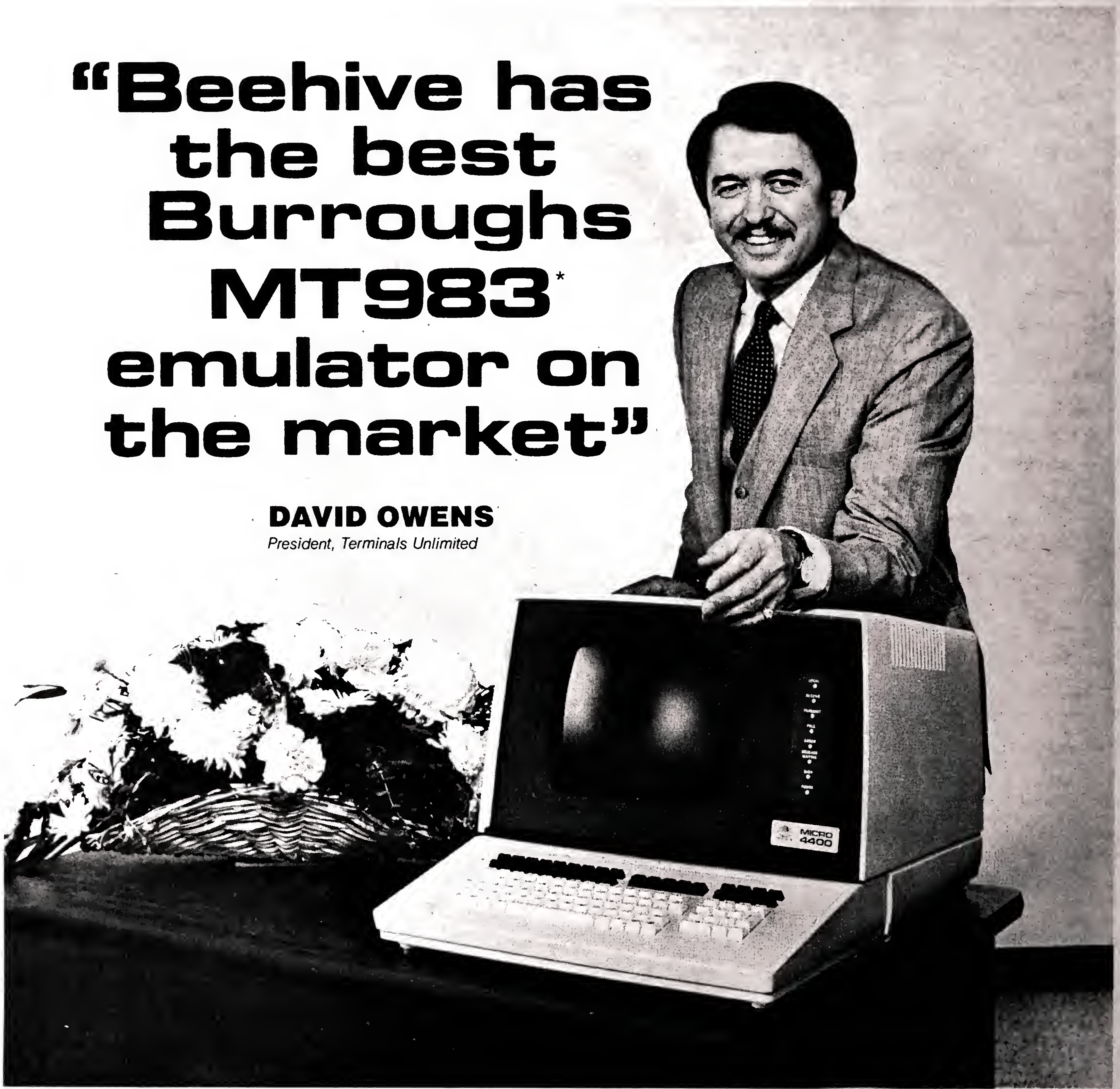

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READER COMMENTARY/Lee Gruenfeld

Automate the Solution, Not the Problem

As in any theoretically proceduralized and voluminously written-about field, systems development is rife with unchallenged truths and givens.

Consultants spend increasingly expensive hours exhorting masses of the uninitiated with "tales of the way things are." Curiously, their status is largely a function of the horror level of their war stories. One is hard-pressed to recall very much cocktail chatter revolving around a smooth systems installation. The DP community is so inured to this situation that it only pays attention to those who have weathered severe storms, as opposed to the true heroes who chose to navigate carefully.

The reason is obvious. Such an astonishingly large number of systems undertakings have encountered major problems at the back end that the 11th-hour slump is practically an official step in the development cycle. The standard lexicon of the developer now includes an admonition to management and users to expect problems during implementation. This is explained as a normal part of the process.

Is this true? If we believe another great truth, that the solution lies in a heavier application of time and effort to the *front* end, why isn't it working? If designers are now spending more time in the actual business operation learning and understanding the user's perspective, why is startup still such an abysmal undertaking?

The Great Systems Myth

Part of the answer lies in the myth that says, "Computer systems can fix operational problems."

They cannot. They can increase efficiency in those situations involving volume and capacity crunches. They can provide capability (read: "features") where it doesn't exist. They can furnish error-free repetitive processing and absorb rapid growth better than manual procedures. However, if an operation started out as shoddy and mismanaged, the probability is overwhelming that a new computer system will simply automate the shoddiness. Further, the detrimental effects of the poorly run operation will multiply as a function of the system's power and the extent to which it has replaced existing procedures.

How does the myth relate to our original problem? Here's a scenario: Schpritzer Tool and Die has a problem in the accounting department. Having started out as a small operation, the seven-man department always handled receivables and payables somewhat hit-or-miss. Whoever had time sent out a few checks now and then, delinquency notices were sent whenever someone happened to notice a late payment and deposits were made once a week and rarely reconciled.

However, as the company grew, a rash of problems arose, including misapplied cash, lost receivables, inability to answer customer inquiries and a host of associated morale and other personnel troubles.

The manager of accounting naturally now takes the modern, documented, accepted path: He decides to automate.

When the specification team arrives, they confront a familiar sight, that of an operation out of control. Their reaction is swift, automatic and classic: "This is a mess. However, what makes us good at our jobs is our ability to integrate large amounts of disorganized information. We will roll up our sleeves, dive in and produce a specification for automating this operation. We expect problems in the end, but that is a normal part of our business and we will warn the users in advance and account for it in our estimates."

What this well-intentioned team doesn't understand is that their modus operandi has in fact made a back-end problem inevitable. Their specification will be an abstract of those features perceived as salient by newcomers to the operation, combined with their sense of what should be. The installation is doomed to be Version No. 1 of a series of painful installations.

What will happen is basically this: The new system will not function as planned. Oh, the programs may be bug-free, but a tidal wave of operational incompatibilities will arise since the innate precision of a computer is inconsistent with the attempt to systematize an imprecise function. This appears to the participants as "normal system startup problems." The DP system is probably as good as it could be, given the circumstances under which it was developed, but it isn't good enough because those circumstances weren't good enough.

The situation gets worse. The denouement of this tragicomedy is yet to take place. We fix what we believe to be the "normal system startup

(Continued on Page 70)

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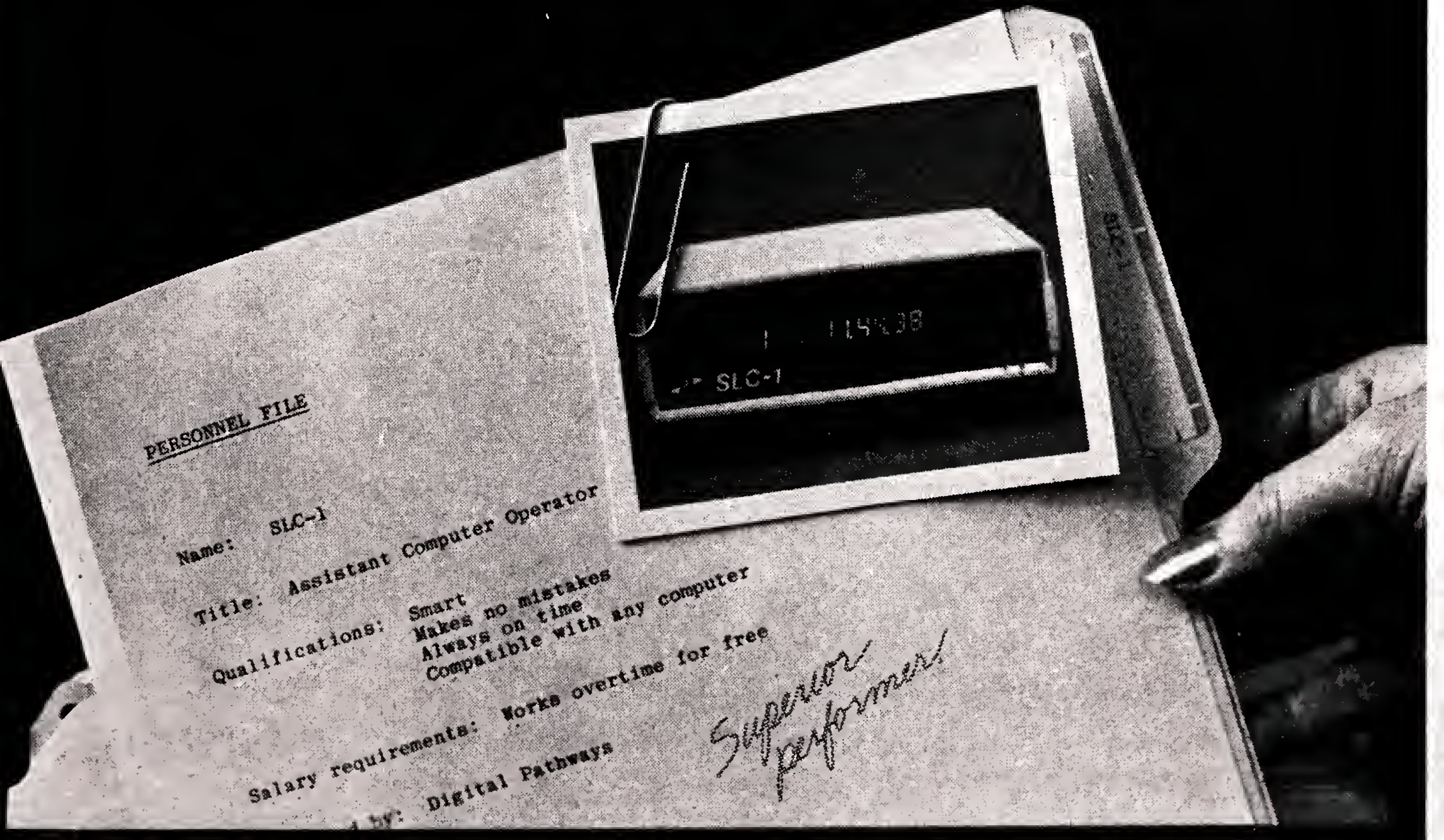

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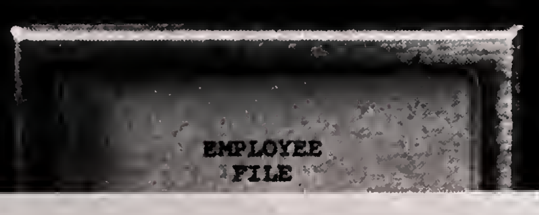

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Automate the Solution, Not the Problem

(Continued from Page 69)

problem," but in reality, we are addressing the original problem of the poorly run operation.

We have traveled far and wide only to arrive at our own back door, but this time it takes more time, more money and more grief to fix things than if we had simply straightened out the problem in the first place. In addition, our new computer system has evolved from a crystalline arrangement of gemlike modules to a Picasso pastiche of patches, fixes and (undoubtedly undocumented) revisions.

Better Tactics

So what could have been done? The following sort of dialogue should have taken place back at Schpritzer when the DP specifications team first met the accounting manager:

DP: The operation is a mess.

Manager: Yes, and your wonderful system will fix it.

DP: No. First you must clean up your mess so that the department will function smoothly. Only when that is done will we automate. Your operation is not a suitable candidate for automation.

Manager: But the time involved . . .

DP: . . . will ultimately be less, and it will be better spent.

Manager: But the expense . . .

DP: . . . will be reduced, if you consider your time as valuable as ours.

Manager: But the aggravation . . .

DP: . . . will be immeasurably diminished.

Manager: But the management information I need . . .

DP: . . . will be delayed. However, you never had it anyway, you don't really know how to use it yet and it would be inaccurate for a long time. Your job as a manager is to fix your current problem, not a brand new, more complex one. We will help you, and when your house is in order, we will automate your smoothly functioning department.

The solution, therefore, lies in refusing to computerize problems. It demands having the vision (courage?) to delay the DP step until the operation has become a suitable candidate for automation. First fixes require heuristic components (like, say, people) rather than the rigidly algorithmic computer.

This is admittedly an unglamorous approach. Neveretheless, businesses have been paying dearly as a result of overselling by the highly aggressive, computer-as-cavalry set. Ads touting machines as the answer to business problems are really saying that one can buy relief from the responsibility of management.

Well, it just ain't so, and the DP community better catch on before "they" do.

Gruenfeld is a senior management consultant with Touche Ross & Co.

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READER COMMENTARY/James E. Station

Standard Contracts for Users a Poor Idea

I recently read of a group, spearheaded by a consulting firm, that is developing a set of standard contracts that will be sold to users for presentation to potential data processing vendors. Not only do I consider this a somewhat naive endeavor, but if the idea is widely accepted, it could well work to the detriment of those users who already approach the acquisition of data processing products and services in a professional, cautious manner.

Let me first clarify that I am in total sympathy with the fact that some sort of reform is indeed necessary. From the day that God created IBM until recent years, DP vendors had been prone to offer "take-it-or-leave-it" agreements for their products and services that insulted man's basic instincts for survival.

However, the flood of new products and vendors over the past few years has awakened many users to the reality that competition breeds flexibility. As a result, most vendors have learned to listen. If a potential customer has reasonable demands, can intelligently support the logic behind those demands and is willing to adopt a mature, professional posture in negotiating mutually acceptable responses to those demands, much can be accomplished.

Vendors' View

Our first question might be, "If the vendor is willing to make contractual concessions, why does he present such an extremely repugnant set of terms and conditions in his standard agreement?"

The answer should be fairly obvious. The vast majority of DP customers, especially first-time users, are still prone to accept the vendor's standard terms with little or no modification.

Vendors would be foolish to voluntarily make unnecessary concessions that would reduce their profit margins. Until the sheer number of users demanding major concessions inflates the vendor's administrative and legal costs to a point higher than the cost of properly warranting their product or service, it simply isn't a practical business decision.

Second, the words "contract" and "negotiate" are virtually synonymous in the legal profession. A user who is cautious enough to engage professional services to review his vendor's contract would feel devastated if the professional advice were "It looks good! Go ahead and sign it."

This would be akin to the management consultant who reviews a business operation for two weeks, submits his weighty invoice and then says, "You're doing everything right. Don't change anything and you have no further need of my services." We all know it doesn't work that way.

So when the potential customer does take a more tempered attitude toward the contract, the vendor knows he is going to have to make some changes. Therefore, the wise approach is to draft the standard agreement with onerous terms that provide ample room for "harmless" negotiation.

If the customer's representative lacks proper knowledge of DP, harmless indeed those concessions may be. But the customer is proud that he took an "enlightened" approach, the professional negotiator feels he has earned his fee and the vendor still has all of the basic terms and conditions intact that he would have been reluctant to concede. In short, everyone prospers. At least temporarily.

So if everything I've said is true, what's wrong with a set of standard contracts for the user?

Assuming that the purpose of the effort is to change the current situation, there would appear to be only two practical approaches. Option 1: Develop an extreme set of terms and conditions that

(Continued on Page 74)

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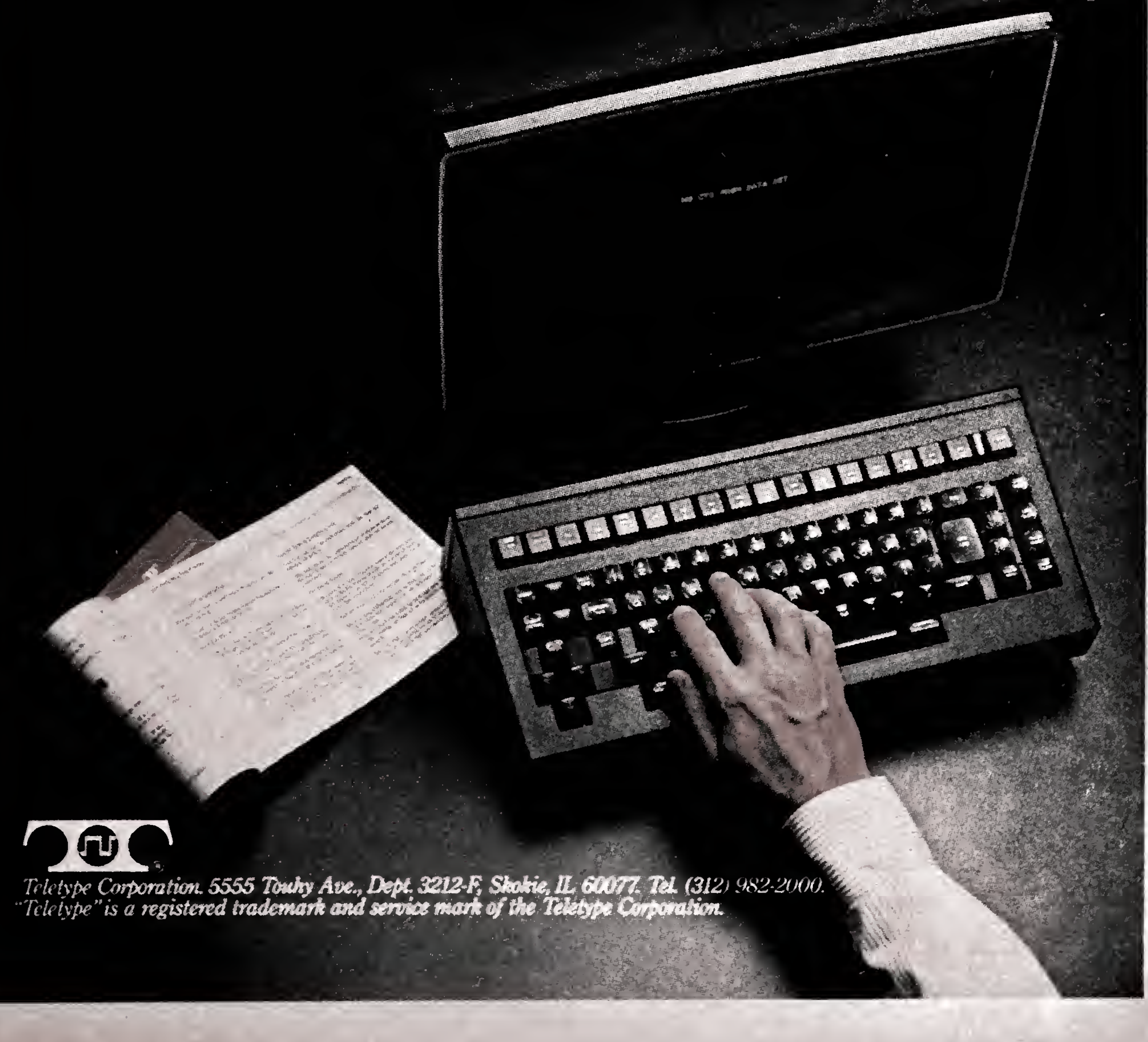

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Idea for Standard Contracts Won't Work

(Continued from Page 71)

will now be onerous to the vendor. Option 2: Develop a reasonable document that anticipates and attempts to satisfy the interests of both parties.

We have discounted the possibility of a document that "looks" equitable, but actually contains subtleties that commit the vendor to more than he would knowingly accept. This is dangerous for many reasons and the user would probably unwittingly negotiate them all back to the vendor.

Therefore, let us take a deeper look at Option 1. Have we essentially done anything more than reverse the roles of protagonist and antagonist? Do we now for some reason expect the majority of vendors to roll over and passively submit to *our* unilateral demands? I think not.

If anything, we would be forcing many vendors to get smarter at the bargaining table. The DP transaction is not an occasional necessity for them. It represents their lifeline. If they address it too casually, they won't stay in business. Those that survive will do so because they have materially strengthened their legal and administrative talents.

And what of the user? Now that he has invested in a set of contracts that more than protect his interests, can he relax over cocktails and extol his wisdom to his Chamber of Commerce buddies? Not unless he plans to deal only with vendors who fail to recognize the severity of their situation, vendors who will soon be forced out of existence.

On the contrary, we suggest that the user, all users, will be faced with even higher costs. Higher professional fees to contend with the higher level of vendor expertise in contractual matters. Higher product fees to cover the vendor's cost of employing that expertise.

And what of Option 2? What if the set of standard agreements truly represents an equitable division of responsibility and risk? At best, the need for contractual foreplay will be lessened. But is this really best for the user?

As startling as it may sound, today's user actually finds himself in an ideal position. The fact that most "vendor-vanilla" contracts are just as repugnant as they were 10 years ago can be a distinct advantage to the intelligent user who is willing to invest some time.

If we accept the fact that most users still sign the vendor's standard agreement with minor modifications, the wise negotiator immediately improves his relative position within the vendor's customer base.

For example, should a maintenance problem arise, the user who has negotiated nonperformance penalties can expect decidedly faster response from the vendor than the majority of users who have accepted the vendor's standard "best efforts" clause. It is essentially the "squeaky wheel" concept and can have the effect of leap-frogging potential queues.

Under Option 2, presumably every user would have the same protection and our place in the queue would be predestined.

A major DP acquisition normally represents a decision with which the user will have to live for a number of years. If the vendor fails to live up to the terms of the agreement, it is not always easy to assert one's legal rights and sever the relationship.

As in any other marriage, it usually pays to learn your level of compatibility *before* tying the knot. If the vendor has no time for contract review meetings, shows no interest in trying to resolve your concerns or takes a "we don't negotiate" posture, pick another vendor.

Contract negotiations should represent a key cog in the overall decision process. Widespread adoption of a set of standard DP agreements, while it may be a step in the right direction for the more timid users, may hold some serious repercussions for industry as a whole.

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REAGAN'S TAX PLAN:

Sweeping Changes In Accounting Software

By Dennis V. Vohs

Sometimes on TV, before stunt men perform feats of daring, you will hear the disclaimer: "This feat is performed by experienced professionals and should not be attempted by our viewers at home." This best sums up my feelings about DP managers trying to develop in-house systems to comply with President Ronald Reagan's tax plan. Without the accounting and tax expertise on hand to do the kind of in-house development required, the task will be difficult at best.

The new tax laws will probably force more revisions to asset management systems than to any other accounting systems. The costs of incorporating the tax revisions in current fixed-assets accounting systems will bring a new perspective to the "make or buy" decision facing many corporate DP managers. The new Reagan tax package may in fact be the deciding factor in making this decision.

Software vendors and the developers of in-house tax accounting and reporting systems face the same problems in dealing with the Reagan tax changes. The question is, who will be better equipped to handle them?

Many companies are not yet aware of the sweeping changes that will have to be incorporated into current tax accounting and reporting systems. Most probably don't know the advantages of rapid compliance.

The tax revision involves substantially faster write-offs for business. The complicated useful life depreciation schedule no longer applies to assets acquired in or after January 1981. Accounting systems will have to handle both the new basic categories that replace the old schedule and at the same time continue to handle those assets acquired before 1981 and still governed according to the old rules.

Looming on the horizon are possible state property tax changes that may use separate tax accounting procedures to prevent expected losses of revenue should the states continue to conform to the federal practices as they have done in the past.

Important Questions

These are the questions both software vendors and in-house system developers must face in dealing with the mandatory tax revisions:

1. Do we have the resources to comply with the changes rapidly and effectively?
2. What is the extent of the tax changes and what needs to be changed in current software systems?
3. What is the best alternative for compliance?

Question of Resources

The availability of accounting resources will be crucial in complying with the new tax laws. In-house accountants are likely to be very busy. The changes to property tax laws are just part of their work load. Outside public accounting firms will also be very busy and may not be able to check changes to corporate accounting systems fast enough for timely compliance with the new tax laws.

Software vendors and DP managers with rotating staffs of programmers and systems analysts may be forced to take a task force approach to the Reagan tax changes. People working on other accounting systems will have to be pulled off ongoing projects to meet the tax changes fast enough to achieve effective compliance.

The problem with this approach is that the tax revisions also affect other systems — such as payroll — so staffing will be spread thin and compliance may be delayed. Programmers who are unfamiliar with fixed-assets accounting will be required to learn asset accounting systems fast enough to be productive.

Another facet of the staffing problem is that in many DP departments, staffing is already too low. In a recent *Computerworld* survey [CW, Aug. 17], more than half of the DP managers (56.5%) responding to the survey admitted they were below optimum staffing levels. Added to this problem was the chronic problem of turnover in data processing departments. Understaffed DP departments will be at a particular disadvantage if extensive changes are required to in-house systems.

Most likely, these changes will be sweeping. In-house systems are often designed for specific corporate situations and may not have the built-in flexibility inherent in accounting packages designed for many clients.

This flexibility of vendor packages is an added edge when system changes are required. Because some vendor packages are designed to accommodate frequent enhancements, changes can be incorporated into systems without requiring a major programming effort.

Steps for Compliance

According to a study by Focus Research, Inc. in West Hartford, Conn., most larger IBM shops either do not have automated financial systems (41%) or have in-house financial management systems (45%) [CW, Aug. 17].

This large group of IBM shops and DP departments on other hardware in similar situations will have to make a choice in dealing with the new tax provisions. They will have to decide whether or not the costs of in-house or manual asset management changes related to the new tax law outweigh the costs of a new vendor package. They will also have to determine whether they have the accounting resources to interpret and comply with the new tax rules.

For those DP departments already on packaged financial systems, it will be a question of whether their vendor delivers system changes fast enough to comply with the law.

To make sure compliance is comprehensive and changes are correct, these steps should be considered:

1. *Evaluation of the Tax Plan:* Reagan's tax proposals should be carefully analyzed, if this has not already been done.

2. *Independent Audit of System Changes:* Specifications for changes should be reviewed by an independent accounting firm to verify that system revisions comply with the tax laws.

3. *Implementing Systems Changes:* After a review of the specifications, a development team consisting of systems analysts, accountants and programmers should implement changes and incorporate them into the system.

Tax reporting formats have not yet been published by the Internal Revenue Service. When they are issued, they can be implemented with only minor modifications to the existing reporting programs. Users will then be able to generate standard reports to meet the new tax reporting requirements.

The In-House Option

In-house software designers typically build asset accounting systems specific to the needs of their particular organizations.

The degree of this specificity will determine the work load in-house system analysts will face in complying with the new tax laws.

Because in-house systems usually consist of specialized routines to handle the asset calculations needed for an organization, a big part of these routines will have to be rewritten because of the comprehensive nature of the new tax law. Because the new tax provisions are mandatory, a major overhaul of in-house systems will be required.

To take full advantage of some of the tax planning options available to businesses at different levels of profitability, a major overhaul of the in-house systems will be needed right away to do tax accounting on assets acquired this year.

Complying with Reagan's tax plan in-house will require these added steps for DP departments unfamiliar with tax accounting laws and systems:

- *Learning the Law:* In-house accountants and DP development people will need to be brought up to date on Reagan's tax plan. At this point, many companies may find that a software package is an attractive alternative to the programming work load that will be required to meet the changes and the accounting and tax resources needed to implement them.
- *Reassigning Personnel:* In-house DP managers rarely have full-time fixed-assets programmers on the staff. In this case, programmers will have to be reassigned to the project of changing tax routines. If the existing in-house system is poorly documented, an additional learning period will be required to learn how the previous tax routines were performed.

3. *Rewriting the Tax Routines:* In-house system revisions will have to take into account that pre-1981 assets will continue to be managed on a system that also handles the new changes. New depreciation categories and accounting methods will have to be developed and new state tax accounting provisions will also have to be managed. And the changes won't stop here. Because the Reagan plan builds phase-in provisions in the depreciation and expensing amounts, these will have to be handled in the next few years as the full tax law changes need to be implemented.

At each stage of in-house compliance, the question of buying a vendor's tax accounting package will come up. Many firms that waited as the earlier tax provisions became effective will find the incentive for early installation of a vendor package. Some corporate controllers will find that the costs of in-house DP modifications of software systems will even outweigh some of the immediate tax savings available under the new law. From this prospective, packaged software may be found to be the best alternative.

Manual Tax Accounting

For firms complying with the new tax provisions manually, the provi-

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ACCELERATED COST RECOVERY TABLE

Applicable Percentage for Class of Property:

Recovery Year	3-Year	5-Year	10-Year	15-Year
1	25	15	8	5
2	38	22	14	10
3	37	21	12	9
4		21	10	8
5		21	10	7
6			10	7
7			9	6
8			9	6
9			9	6
10			9	6
11				6
12				6
13				6
14				6
15				6
	100	100	100	100

Property placed in service after Dec. 31, 1980
and before Jan. 1, 1985.

Figure 1

sions of the Accelerated Cost Recovery System (ACRS) will be an added burden. Many companies never had the in-house resource to develop automated fixed-assets systems in the past. As a result, they may have missed the opportunities for tax savings under the Asset Depreciation Range (ADR) provisions in the past. Because they were processing assets manually, they may also have missed the tax "modeling" features of some automated systems that would have let them switch depreciation methods to achieve greater tax savings.

Depending on the changes to state laws, companies handling assets manually may also have the increased work load of maintaining multiple sets of books. The structure for these firms will also become more complex as assets need to be managed under both the old and new laws according to the date of acquisition.

For organizations using manual tax accounting procedures for fixed assets, it will be a question of the volume of the assets they have to track. The higher the volume of assets to be managed and the greater the accounting complexity, the more a packaged software system will be a desirable alternative.

Extent of Reagan Changes

Two major features affecting businesses in the Economic Recovery Tax Act of 1981 are the Accelerated Cost Recovery System for fixed assets and liberalized investment tax credit rules.

Under previous tax laws, depreciation was recognized over the useful life of an asset. Asset depreciation range guidelines established in the early 1970s provided the taxpayers with ranges of estimated lives the IRS could not challenge. The useful life depreciation rules have been replaced with ACRS, which prescribes shorter periods over which to recover the cost of assets. ACRS was designed to stimulate capital investment and technological innovation.

Unlike previous tax depreciation options such as ADR, ACRS provisions are mandatory. Within the ACRS provisions, however, there are options that allow an organization to minimize cost recovery in low-profit years and maximize tax recovery in high-profit years. The mandatory implementation and the flexibility of the rules place additional burdens on data processing departments.

ACRS Provisions

Under ACRS, assets are generally grouped into four recovery periods of three, five, 10 or 15 years. Assets are grouped into cost recovery periods depending on the nature of the assets:

Three-Year Property Class: Includes vehicles such as autos, light trucks, research and development equipment and other assets that previously qualified for an ADR midpoint guideline life of four years or fewer.

Five-Year Property Class: Most other machinery and equipment, furniture and fixtures. This classification also includes some agricultural structures and petroleum storage facilities.

Ten-Year Property Class: Includes certain public utility property and short-lived real property.

Fifteen-Year Property Class: Includes most real property and other public utility properties.

Unlike methods for calculating depreciation under previous tax laws that used a computation based on a formula, ACRS specifies a table of write-off percentages (Figure 1) for each year of the recovery periods. Recovery allowance is calculated by multiplying cost times the appropriate percentage.

Cost recovery may be slowed by using a straight-line recovery method and electing an optional recovery period:

ACCELERATED COST RECOVERY TABLE

General Cost Recovery Class	Optional Recovery Periods
3-Year	3, 5 or 12 Years
5-Year	5, 12 or 25 Years
10-Year	10, 25 or 35 Years
15-Year	15, 35 or 45 Years

The same elected recovery method and period must be applied to all assets within a class placed in service in the same year. The elections for 15-year real estate may be made on an individual property basis. Additional tax law changes under ACRS include changes in the recapture rule for real property.

The Economic Recovery Tax modifies the investment tax credit (ITC) rules in several areas including rate changes, change in recapture of the credit on disposals and increase in the limitation on used property.

For property placed in service after Dec. 31, 1980, ITC on qualifying assets is equal to 10% of cost for assets in the five-, 10- and 15- year categories, and 6% for assets in the three-year category. The credit is earned at a rate of 2% annually, therefore no recapture is required if three-year property is held three years and all other qualifying property is held five years.

Before the tax law changed, ITC could be recognized on used property with a total cost of up to $100,000. The limit has been raised to $125,000, with an additional increase to $150,000 to go into effect in 1985.

Other changes to the ITC rules include application of "at-risk rules," special rates for rehabilitation projects and extended carry-over rules for unused credits.

State Tax Laws

The Reagan tax cuts will mean added burdens for many states that have tax formulas linked to those of the federal government. Many states automatically adopt the federal depreciation formulas for determining taxable income and property bases. Therefore, the new federal depreciation schedules are expected to be among the biggest drains on state revenue. As a result, some states already have proposed laws severing the links between state and federal tax formulas.

If individual states pull away from the federal schedules or rules, it will compound the burden on accounting departments trying to comply with the Reagan changes. The new federal laws will mean that businesses now

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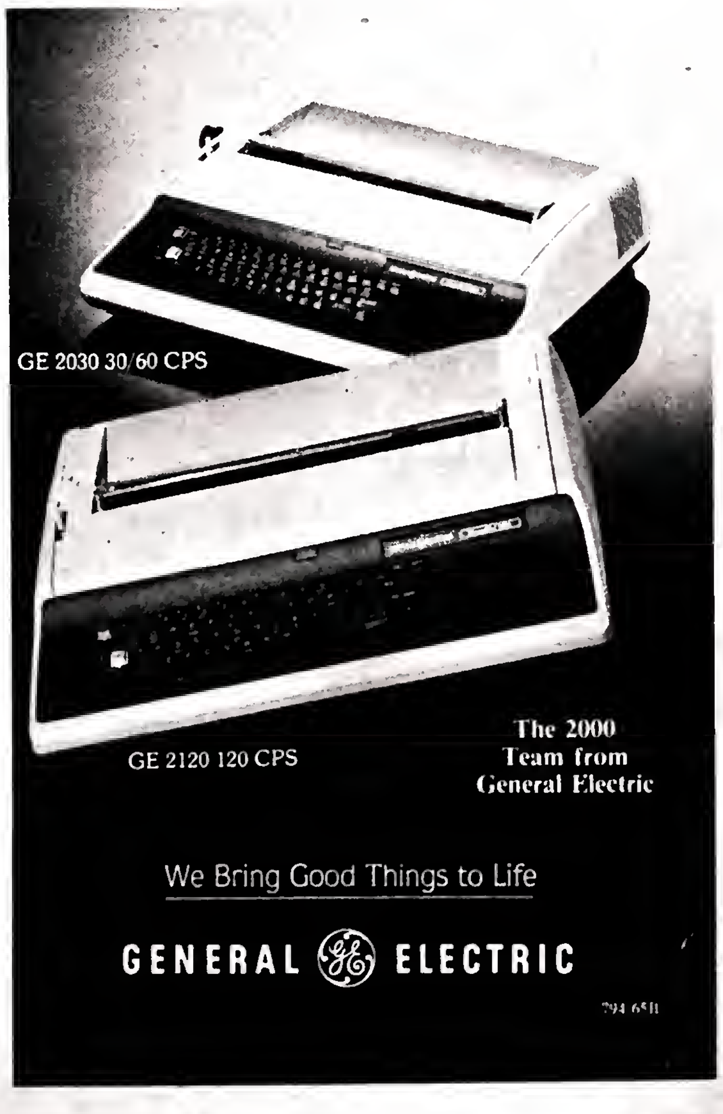

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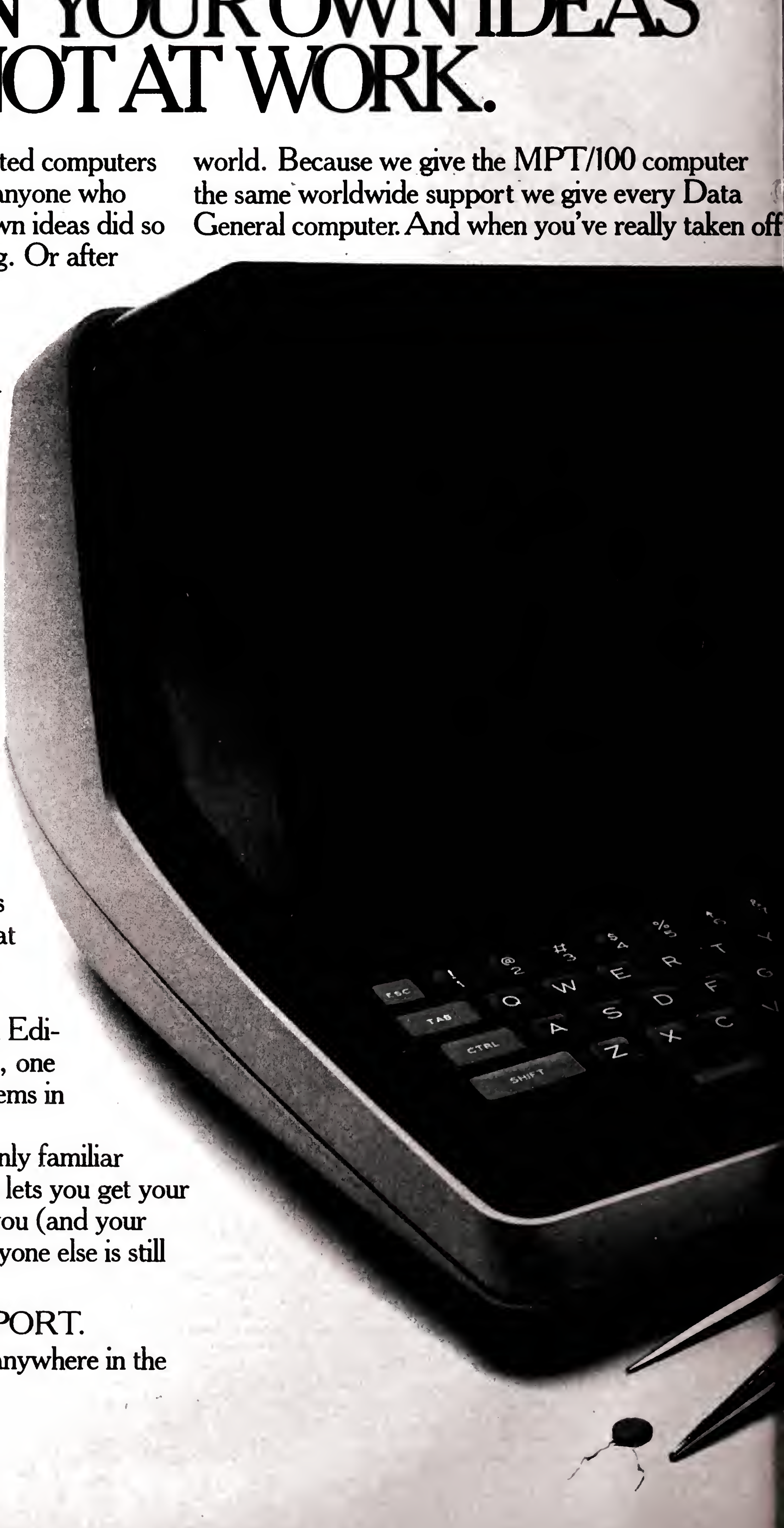

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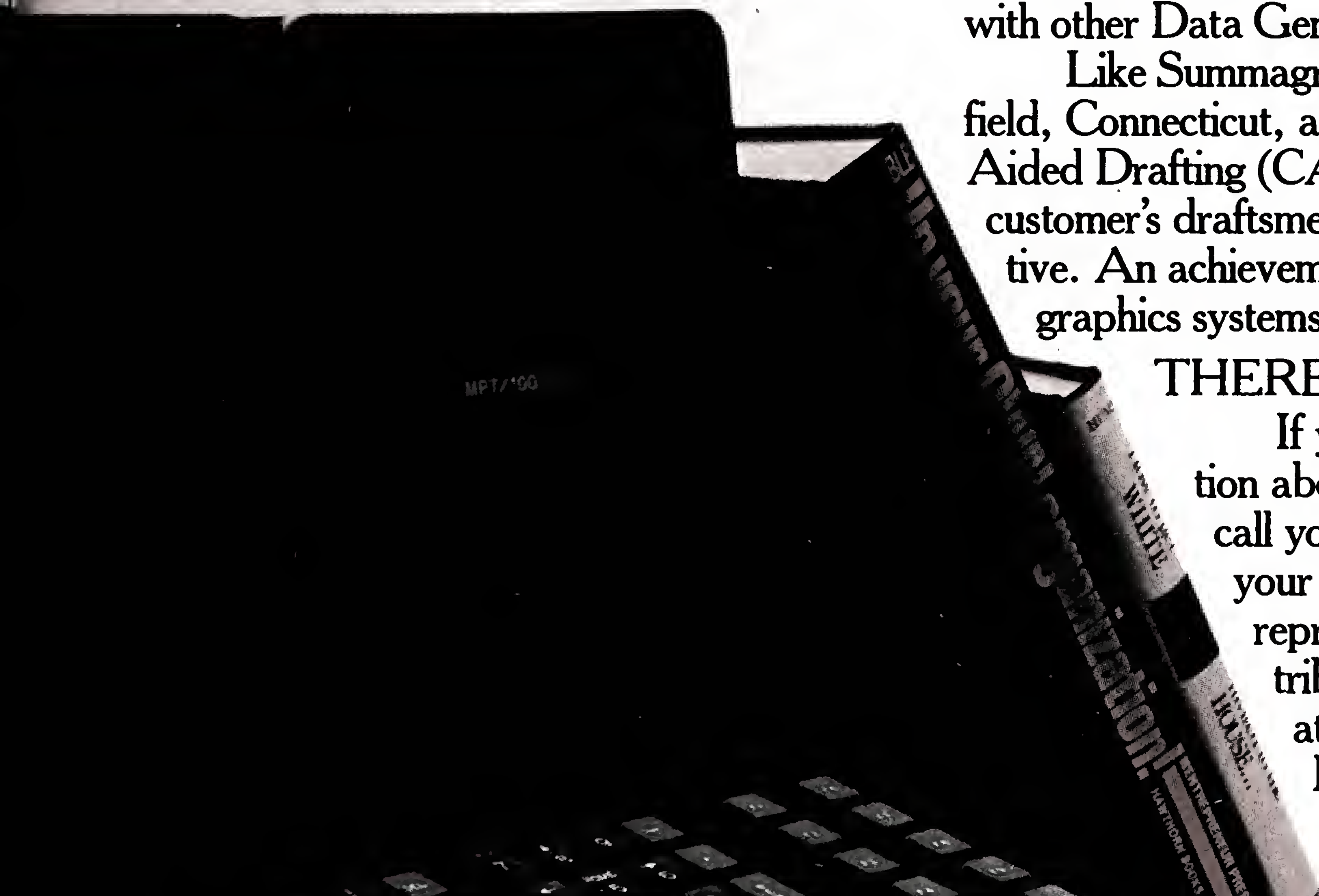

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have to do accounting for assets under both the old rules and ACRS. If the states break away from the federal schedules, an additional set of books will be required for depreciating corporate assets.

Should a significant number of states adopt their own tax provisions and depreciation schedules, it will mean systems will have to handle multiple sets of books for federal, state and local tax accounting.

Software vendors that incorporate the new tax changes into their systems first will have a definite marketing edge over their competitors. While most vendors will claim they can handle changes in their existing systems, the new tax laws will involve important programming revisions for many. Even more important than the fact that certain systems comply with the laws will be the question of how easy it will be to use the new systems and programs that handle compliance.

The ACRS changes will have to be in place by December 1981 to enable corporations to do tax calculations for this year. Vendors that offer the option of compliance before that date can offer additional advantages for firms with fiscal years ending earlier in 1981. Corporations that chose depreciation under the old "modified half-year rule" may get certain unexpected deductions for fiscal 1981 only. Because the new rules are retroactive to Jan. 1, they can take write-offs under both old rules and ACRS.

In many ways, the race for ACRS compliance parallels the competition between fixed-assets software vendors to reach full compliance with previous rulings of the Financial Accounting Standards Board (Fasb) when its rulings became effective.

Challenge of Compliance

In the next few months, accounting departments will have to move fast to learn the new tax laws and to comply with them. They will have to comply either manually, by putting pressure on their DP departments, or by buying a software package.

Should they choose a software package, they will have to take into account the service potential of vendors as well as the quality of the systems. Because the software business is definitely a service business, the software vendor chosen should be able to offer a lot more than working code. Vendors that have more depth in accounting resources and more depth in R&D may be better equipped to provide the kind of specialized support needed to accomplish the tax changes.

To implement the Economic Recovery Tax Act changes in-house, resources may be stretched thin. In addition, public accounting firms will probably be swamped in their attempts to handle the tax changes for individual clients. I believe software firms having committed accounting and research resources will have the strongest advantages in dealing with the new tax rules.

After all, there are times when even the best performers have to leave the tricky stunts to the experts so they can get through the other scenes in one piece.

About the Author

Dennis V. Vohs is group vice-president, technical operations, for Management Science America, Inc. (MSA), where he has been involved in the design and implementation of various application software systems. He served as project leader for the development of MSA's General Ledger/Financial Information and Control System.

Vohs is a member of the National Association of Accountants and the American Management Association.

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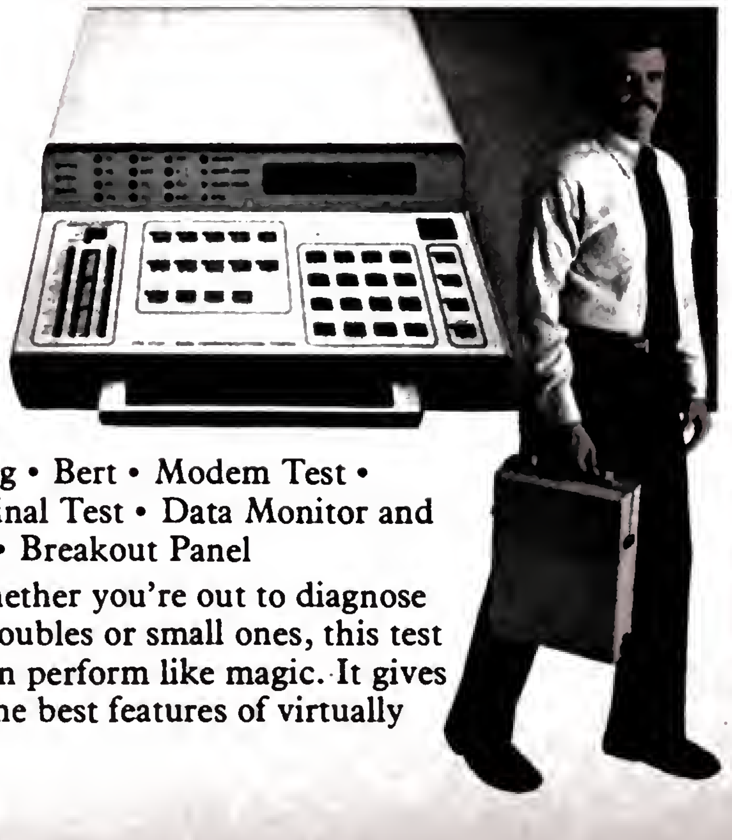

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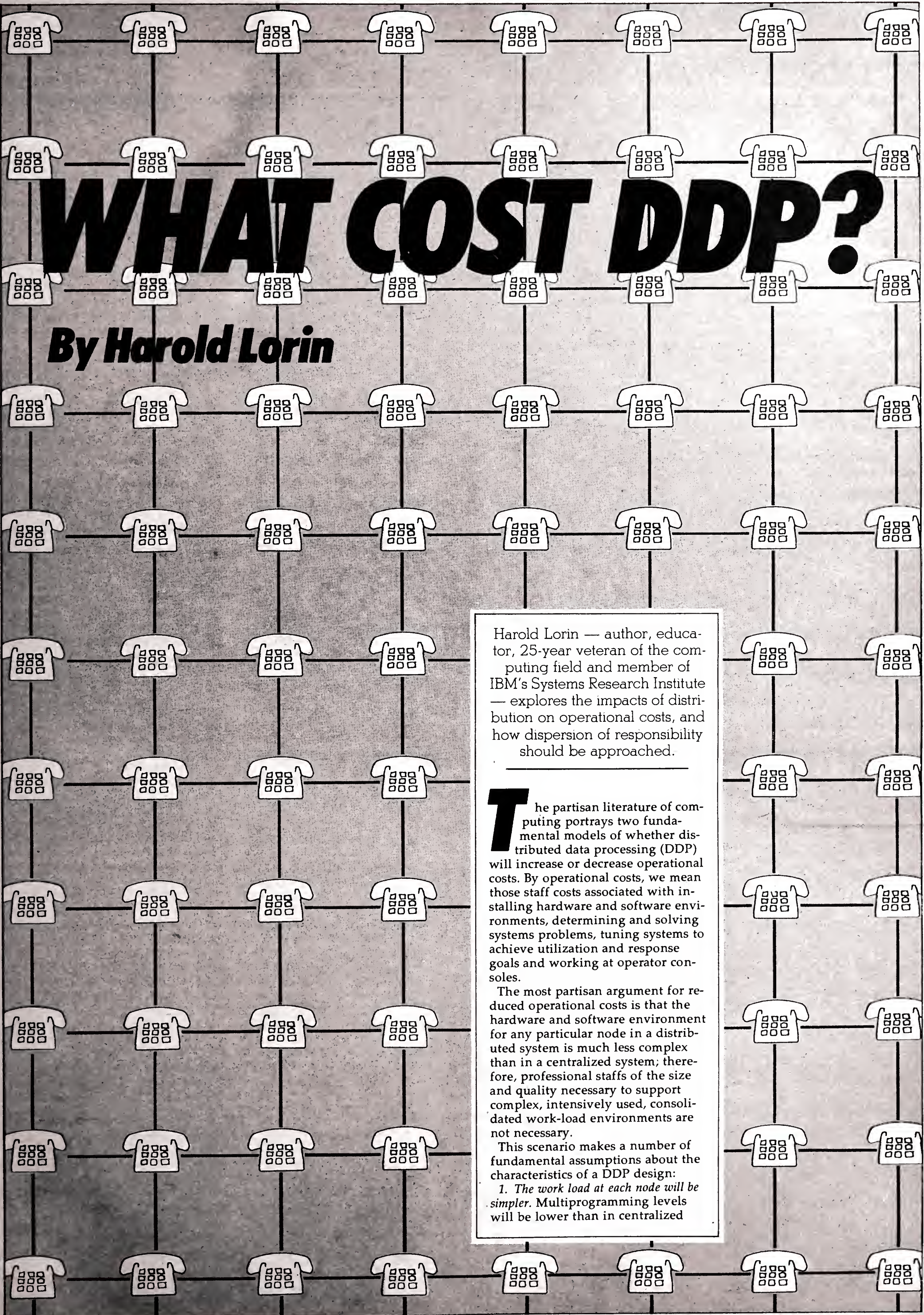

WHAT COST DDP?

By Harold Lorin

Harold Lorin — author, educator, 25-year veteran of the computing field and member of IBM's Systems Research Institute — explores the impacts of distribution on operational costs, and how dispersion of responsibility should be approached.

The partisan literature of computing portrays two fundamental models of whether distributed data processing (DDP) will increase or decrease operational costs. By operational costs, we mean those staff costs associated with installing hardware and software environments, determining and solving systems problems, tuning systems to achieve utilization and response goals and working at operator consoles.

The most partisan argument for reduced operational costs is that the hardware and software environment for any particular node in a distributed system is much less complex than in a centralized system; therefore, professional staffs of the size and quality necessary to support complex, intensively used, consolidated work-load environments are not necessary.

This scenario makes a number of fundamental assumptions about the characteristics of a DDP design:

1. *The work load at each node will be simpler.* Multiprogramming levels will be lower than in centralized

systems. Sharing will tend to be within related application contexts. As a result, system tuning will be a much less expensive undertaking.

2. *The software itself is easier to use.* Resource management algorithms and the interfaces associated with them will be less complex and suitable for much less sophisticated personnel. This will contribute to lower tuning costs, and the software errors that occur in complex software run under stress will be avoided. Staff expense attributable to problem determination will be reduced as well as educational expenses associated with learning the software. In the extreme view, no systems programmers are necessary because senior applications programmers will be able to install, tune and correct simple performance problems and software bugs.

3. *The hardware system is cheaper and can be run at lower utilization levels than those associated with larger, centralized systems.* As a consequence, the effort associated with maintaining less than 1-second response time at utilization levels approaching 98% can be eliminated.

4. *In homogeneous environments using identical software packages at the operating system, access method, data or file manager level, an identical version can be used at all nodes and all nodes can have identical performance parameters.* This means the proliferation of nodes does not cause an increase in software nursing expenses. This effect of homogeneity will be particularly important in local networking environments where professional operations staff may service all nodes with negligible incremental expense.

5. *The operator interfaces at each node are very simple so that end users who can run keyboard-driven devices and change paper in a printer can operate the system.* There is no need for professional operators as there is no need for professional systems programmers at each node.

6. *Software packages for small machines tend to be more stable.* They may even be acquired on a purchase basis. As a result, the effort invested in maintaining vendor software at a current release level is not appropriate for a distributed environment.

The above scenario might be characteristic of a peer network of business unit nodes where systems are highly integrated, software interfaces rather clean, operational procedures very simple and levels of sharing rather moderate.

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The assumptions of the previous scenario are replaced here with a rather different picture of a DDP system. And it is the author's impression, despite a predilection for distributed systems, that the model of DDP implied here may actually be more realistic.

1. *Operational environments may be complex in centralized systems, but they become more complex in distributed systems.* It is necessary to add a capability to control communications functions as well as to plan and enforce usage standards that will preserve the economics of communications networks. Increases in operational costs resulting from more complex network environments occur whether network management is centralized or distributed in some fashion. In effect, all operating costs for centralized systems continue with considerable cost increments because of node interconnection and multiplicity of nodes.

2. *Distributed systems require a means of doing remote problem determination, with a staff of experts to analyze data for this function and sustain interaction with the network to correct errors.* Some problem determination expertise may be dispersed to distributed nodes. While specific scenarios will change the balances of central and remote staff incremental costs, all scenarios must involve some incremental costs regardless of how problem determination activities are dispersed between nodes and central staffs.

3. *Distributed nodes demand an increase in the sophistication and population of console operators to control dispersed computer equipment.* This operational cost is not necessarily avoided if the network is local. While network control costs may be lowered on a local network, remote node operation is required whether a remote node is on the floor below or in another town. The alternative to increased remote operator function is to disperse operators to all nodes, a solution that tends to be even more expensive. Current levels of programmed operator available with sizable general-purpose computers do not eliminate the need for operators.

4. *Different versions of software operating at different nodes, or completely different software packages, will require individual installation, tuning and problem determination skills.* This will require an enlarged centralized staff or the replication of certain skills of high professional cost at each system node.

5. *Distributed systems imply an entirely new level of software sophistication to support various interconnection and distribution strategies.* The population of software packages that must be attended increases.

The scenario that is the basis for the above arguments is a network of nodes, each of which supports a computing device whose hardware is sufficiently expensive so that some interest in utilization levels must be maintained. In addition, the software is not truly easier to use and understand than that of a centralized system, and interconnection itself creates operational expenses. The scenario includes a distribution of large-scale systems running under top-of-the-line operating systems, geographically distant from a mixed population of smaller processors of mixed architecture running a diversity of systems software with a complex of intelligent network devices for switching, routing, gateway and concentrator functions. Other factors adding to an increase in operational expense would be privately developed systems software and a diversity of work load characteristics across the nodes.

The issue is not which of the above scenarios is more realistic, but the comparative cost of distribution in a complex environment vs. the cost of running a large central installation with the same diversity of work-load and response requirements. This center might well involve multiple stand-alone or channel-interconnected large systems running somewhat more homogeneous software. The extent to which the software would be more homogeneous in a large center is not at all clear. An organization that can insist on the standard use of software environments for all applications production activity at a center may also be able to enforce homogeneity on dispersed nodes.

Factors in Operational Expense

In general, the following factors seem to affect operational cost:

1. The geographical distance of the nodes. There is a tendency for operational costs to be sensitive to whether the distributed system is based upon a local network or a geographically dispersed network.

2. The number of nodes. Operational costs will tend to increase as a function of the number of computer systems because of the need to enlarge central staff to control more machines or the need to replicate operational functions at different node sites. Remote and programmed operator facilities attempt to flatten the curve.

3. The software interfaces associated with any node in terms of the complexity of the interfaces themselves and the heterogeneity of the software population across the nodes.

4. The diversity of work-load characteristics associated with each node and the degree to which diverse work loads make the tuning of any system a special case, denying economies of scale in the tuning and performance analysis function.

5. The definitions of success in terms of response time requirements at very high utilization levels.

6. The diversity of problem types as a result of the diversity of hardware and software architectures within the network.

7. The complexity of the hardware

and the degree to which its expense requires that a node be maintained at high utilization levels.

Cost Significance

The author has had a number of discussions with various organizations at various points in planning for distributed processing or in justifying the degree to which their long and intermediate plans for computing do or do not include distribution.

There are two viewpoints about the importance of understanding the impact of distribution on operational costs. One view is that the value of distributed processing in terms of user satisfaction, responsiveness, flexibility, local direction and so on is such that variations in operational cost are at the noise level. The probability is that the total variation in operational cost across different configurations will be much less than 15% and that systems planning should have that kind of latitude. In essense, this view is that operational costs are not a determining factor in deciding whether or not to distribute.

The alternative view is that operational costs attributable to software systems and operations are a serious potential inhibitor of distribution. Total systems costs associated with software maintenance, evolution and operation may represent a greater percentage of the DP budget than does the hardware bill and are as critical as programming costs. Programming costs have received a good deal of attention as an area of unacceptable economics and as a restraint on systems growth. The required skills and costs to sustain operational environments, however, are just as significant.

Minimizing Operational Costs

The initial scenarios presented above provide two extremes on a continuum of environments. Clearly, as environments can be made to resemble the first scenario, operational costs will decrease. At some point they may be forced beneath those to be expected with a machine center of similar computational load. Therefore, a number of guides for controlling operational costs naturally fall out of the scenarios.

1. An additional investment in hardware may reduce operational costs. Although there may not be economies of scale across the broad range of computer models, there may be local economy of scale within a narrower model range, or the pricing from model to model may be flat. Investment in larger hardware systems may reduce operational costs in a number of basic ways.

Tuning and performance expenses may be reduced if the node has excess capacity sufficient not only to provide good response times for local users, but to maintain the response times in the presence of peaks in node interaction. It is very expensive to tune a node not only for variations in local performance but also to accommodate changing patterns of node interaction across diverse transaction types and remote data references. The goal here is to minimize the tuning and performance analysis/adjustment expenses by buying relatively cheap excess capacity.

Excess processor and memory capacity need not imply higher storage expenses. The amount of storage required by a particular node is not a function of the processor speed and size. Some increase in storage expense may be justified, however, if the performance of a node may be enhanced by redistributing data underneath a larger population of arms and pathways. An associated advantage of a larger machine of a particular architecture is the usual ability to handle more channels and more arms. This proliferation of arms and pathways may help stabilize performance across differing data reference patterns, local and remote.

A larger node may also reduce operational expense by reducing the number of different software environments. For example, in a hierarchic distributed architecture where a set of large systems interacts with a set of smaller systems, it is common for the smaller and large systems to run different operating systems. An increase in the model capacity of the smaller systems may allow them to run versions of the larger operating system.

Since the smaller nodes will run under less software stress than the larger nodes, the increased expense of running multiple copies of the larger system will be disproportionately small. The excess capacity of the smaller system will not be consumed by the larger software system since the large system functions that consume computer power will not be run in the small node environment.

On the other hand, the need for competence in multiple systems is reduced. Not only are there more homogeneous console interfaces, but costs for installation and maintenance of the software packages may be reduced. This reduction will occur whether operational staff is dispersed or centralized. If the design cannot justify a larger machine that can run the operating system of the largest nodes, the user can attempt to use very highly packaged and integrated systems on the smaller machines.

2. In each case, the user should determine if added value will justify a different architecture or software system at a node. This is not to suggest that it will be hard to find instances of real value added in terms of appropriateness of interface to users, availability of applications packages or reduction of node cost. But the justification must be made to assure that operational costs will not outweigh the user and application development advantages.

For each hardware/software environment, the organization must determine the extent of central operator, central problem determination and other facilities (or the extent to which programmed operator facilities exist) and the nature of the software installation, specialization and maintenance procedures that are associated with the package.

It may be wise to define a number of operational environments associated with various node types that will define some small number of software environments, but it is never wise to allow the ad hoc proliferation of systems environments.

3. The organization should determine if the network can be designed so that the system expense of network optimization and traffic control can be minimized. This may or may not be possible, but communications costs may be dropping more significantly now than they have in the past, and a reduction in network efficiency competence costs may offset low line utilization and alternate path costs sooner than we expect.

4. A very clear understanding of the competence and training associated with systems programming and operational skills for every candidate environment is absolutely necessary. This must be associated with an analysis of package installation, maintenance and evolution expenses for each candidate type of software support.

Economies of scale in distribution might be achieved by multiplying the number of nodes that can run in the context of a set of standardized environments. These economies may be obtained at the expense of additional hardware and communications costs and may be achieved whether the professional staff remains centralized or is dispersed.

Distribution of Functions

The decision to distribute computing nodes in some fashion leaves an organization some other decisions about how to disperse operational functions. Operations may remain centralized, completely dispersed or selectively dispersed to nodes of the distributed system or network.

The determining factor in dispersing operational function is the degree to which economics of scale will be realized in the centralized operational structure. It is well understood that computer processor and memory pricing currently allows for the building of large systems out of an aggregation of smaller systems without unacceptably large hardware

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price penalties. However, there may be reason to believe that there are economies of scale in professional staff. This belief leads to resistance to any distributed processing at all or to resistance to distributing operational function with distributed computer nodes.

A basic economic concept pertaining to marginal utility can be applied here. This notion is represented by a more-or-less U-shaped curve that represents the idea of diminishing effectiveness. This curve has a knee. To the left of the knee, increases in the input of some effort or resource lead to disproportionate increases in the value of production, in the number of units produced, in the number of instructions a computer can execute per second and so on.

To the right of this knee, increases in investment or effort result in a disproportionately small increase in the profitability or productivity of a production facility. The curve is universal and applies to almost every human activity, including the organization of data processing operations.

Economies of scale hold in computer operations departments when the ability to increase the utilization of professional staff is more significant than the costs of managing a large and complex department. Operational talents and skills, when grouped together under a single management structure, may be used more intensively because the skills may be applied to a wider number of systems. A staff of 15 professionals may be required to support a single very large system. The addition of a second system may require only a small increment in staff, a third an even smaller increment and so on.

Computational power or number of software elements installed and tuned, for example, increase much more sharply than the number of people-hours required to provide support for multiple machines.

As the number of machines grows, even though the staff grows at a much slower rate, a point will be reached where the incremental productivity of the staff will become smaller and smaller and where it may even decrease.

This happens because the management structure and formal management requirements begin to draw off time and talent from the primary function of installing software and operating consoles. There is a scaffolding effect and a requirement that some energy be invested in the management of the structure itself rather than in the management of computer systems. At this point, one may begin to see some diseconomy of scale in the organization of centralized computer operations.

There are other limitations to the effective sharing of computer talent that we will discuss shortly.

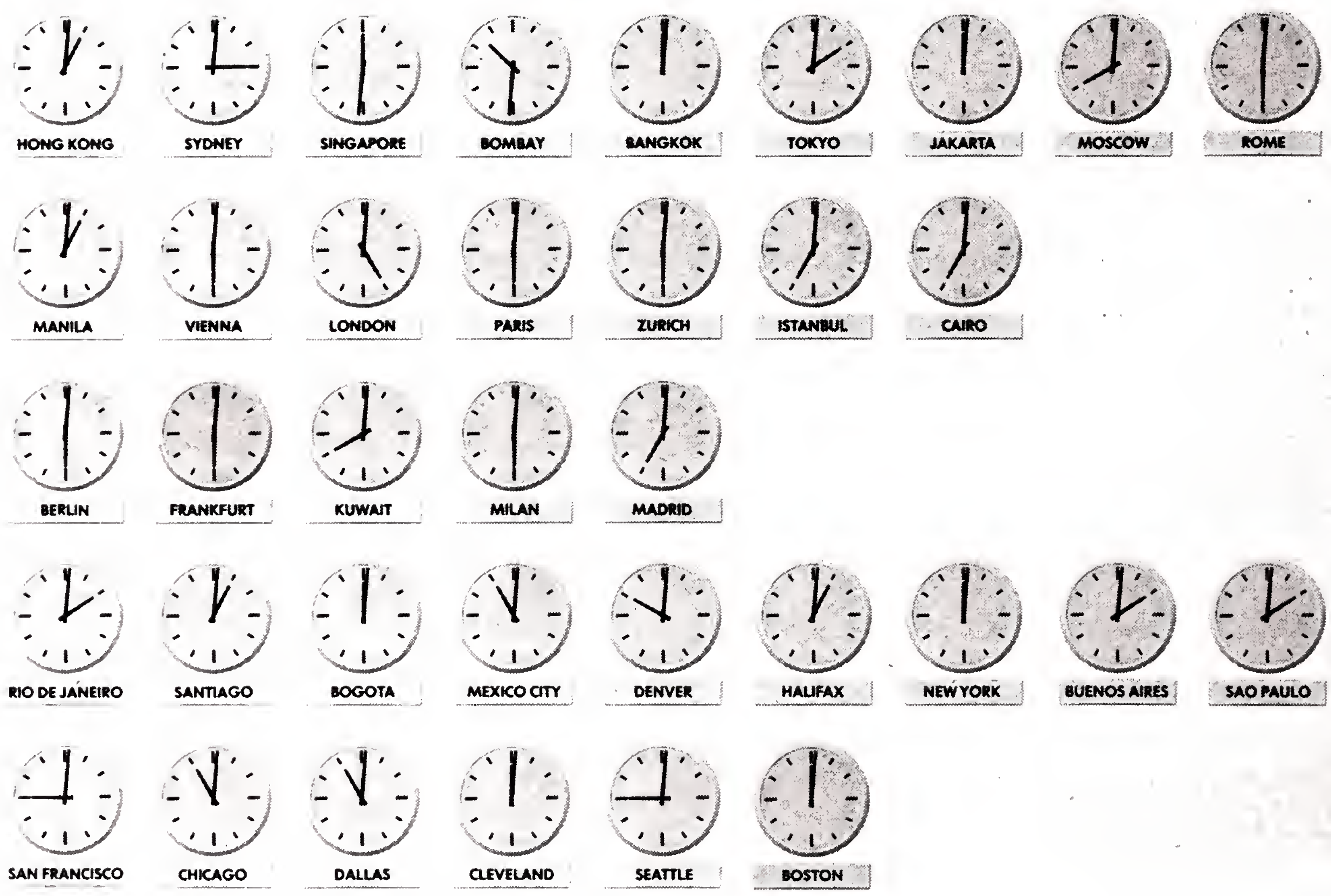
Efficiency vs. Effectiveness

An operations function operating to the right of the knee is inefficient and may well be a candidate for dispersion to business units. And even when an operations function is working efficiently, it may not be working effectively. Users may view the function as unresponsive to need and the service provided as being below their requirements for responsiveness and reliability.

That is, a centralized operational staff that has not yet "gone around the bend" in terms of its efficiency may still be a candidate for dispersion when it is measured by user requirements. The operational cost per unit of information produced has not yet begun to rise, but costs to the organization are being incurred because of late delivery of information or slow response times.

This idea may also be represented as a U-shaped curve. The y-axis of this curve represents the total per-unit cost of information processing. The x-axis represents some measure of the operations function's responsiveness to user need. To the left of the knee, total per-unit cost of information decreases because the growth of the operations organization allows it to be more responsive to user needs, to manage computing more effectively. The cost per unit of information produced decreases as staff size grows and information is delivered on satisfactory schedules.

The right of the knee represents an increasing cost of computing because



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the complexity of operations results in delays in delivering information to a using organization. The information's value decays as a function of lateness. Total cost of computing goes up because of a net reduction in the value of information delivered.

In an organization where quality of service is highly regarded, a decentralization of operations may be interesting when the effectiveness curve turns the corner, sometime before the efficiency curve turns the corner.

Curves, Operational Costs

The economy-of-scale curves suggest that there is no inherent economy of scale in highly centralized operations, but that the efficiency of distributed operations vs. centralized operations is scenario-specific. It depends on the size of the staff, the importance of service vs. the importance of optimizing machine use and the specific functions the staff performs.

It would be very difficult to develop metrics and calibrations for effectiveness or efficiency curves. To draw an effectiveness curve, one must know how much value the information loses as a result of bad service to a user. This is very difficult to quantify.

To draw an efficiency curve, an organization must define some quantity that measures the efficiency of the operations staff. Ideally, an organization could map the total number of transactions passed through a system per scheduling period into some normalized measure of systems work. This number would then be divided into the total costs ascribable to an operations staff to determine a figure of merit in terms of how much work is being done per dollar of expense in operations.

For example, if 10,000 normalized transactions flow through a system per day and there are 220 working days per year, then 2,200,000 standard transactions are processed per year. If the annual salary expense of an operations staff is $400,000, then the per-transaction cost ascribable to operational salary expenses is $55 per transaction. This is a rough measure of operational cost.

If an organization is operating to the left of the knee, then each increment in operations costs will result in a decrement in the per-transaction cost ascribable to operations. On the right of the knee, where operational costs are rising more rapidly than transactions processed, total operational cost per transaction will increase as operations costs increase.

How does one begin to guess whether one is to the right or the left of the knee? One approach is to determine how professional and technical employees spend their time. One looks for some measure of the administrative burden and how a highly bureaucratized atmosphere is interfering with the productivity of operations personnel. An organization with multiple levels of management and in which professional employees are spending a good deal of time filling out reports, forms and so on is less efficient than an organization in which the professional employees are doing professional tasks.

A rough approach is to collect activity data over a period of time to determine what percentage of time is passed by professional employees responding to the needs of the bureaucracy. One is operating to the right of the knee when investment of time in procedures exceeds idle time for an employee working in a smaller, less structured environment.

But it is not only bureaucratic burden that may push an operational organization to the right of the knee. The nature of the business units that are being supported by the operational staff may minimize the extent to which skills are shared. A variety of systems may already exist in a center, and the diversity of work-load characteristics for different business units may make specialized tuning and installation requirements necessary.

As a result, the performance expert for System A is not really able to do much for System B. In many large center structures that are economically justified by an assumption of increased skills utilization, there may actually be less effective cross-service efficiency than burden-of-management complexity.

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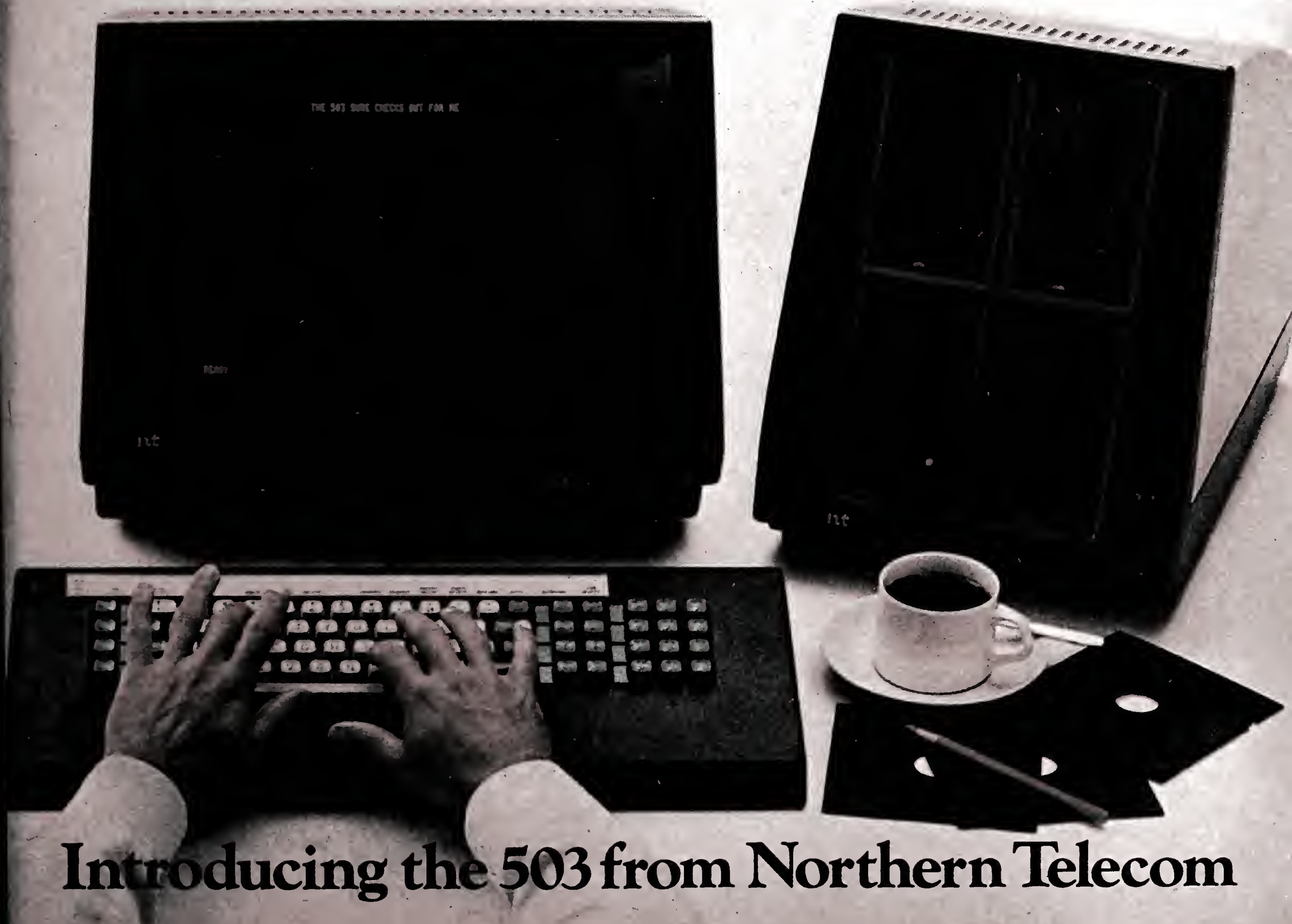

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Operational responsibilities include installing software, operating nodes, operating the network, determining problems and tuning and adjusting the software configuration to meet performance goals. In the most expensive scenario, a competent staff is geographically dispersed so that each node is independent and capable of operation, installation, problem and performance analysis. Such a dispersion can only be less expensive than centralized operational activity if the requirements for these functions at each location are close to trivial.

This will be true if the nodes themselves come with highly integrated, preconfigured software so that installation of each one is a small expense; if the operator interfaces are trivial and no specialized floor operations staff is required; if performance analysis is not an important issue; and if network structure is such that network management does not emerge as a specifically required skill.

While distributed processing may take this form, for various reasons the software/hardware bases of many DDP systems will not have these characteristics. Political and technical reasons may dictate the use of systems with more inherent operational cost factors.

Following are some general rules of thumb that might be useful in making decisions about dispersion of operational skills:

1. If the hardware/software nodes have similar underlying software structures but require professional preparation, systems editing, generation and parameterization, it is better to maintain the software installation function as a centralized activity.

This is particularly true if an investment is made in automated distribution of package levels. The cost per function installed will tend to be minimized by a centralized installation function servicing many nodes. This advantage will decay, however, to the extent that specialized software configuration is required for each node.

2. If the node population is heterogeneous and if installation is simple, distribution of the installation function may reduce costs. The management and network controls necessary to support the centralized installation of simple systems may be more than the cost of dispersing the function.

3. If the population of nodes is heterogeneous to the extent that different packages are being used, as opposed to different versions of the same package, then the installation of simple software systems may be dispersed. However, the installation of complex software should remain centralized and supported by automated software dispersion functions.

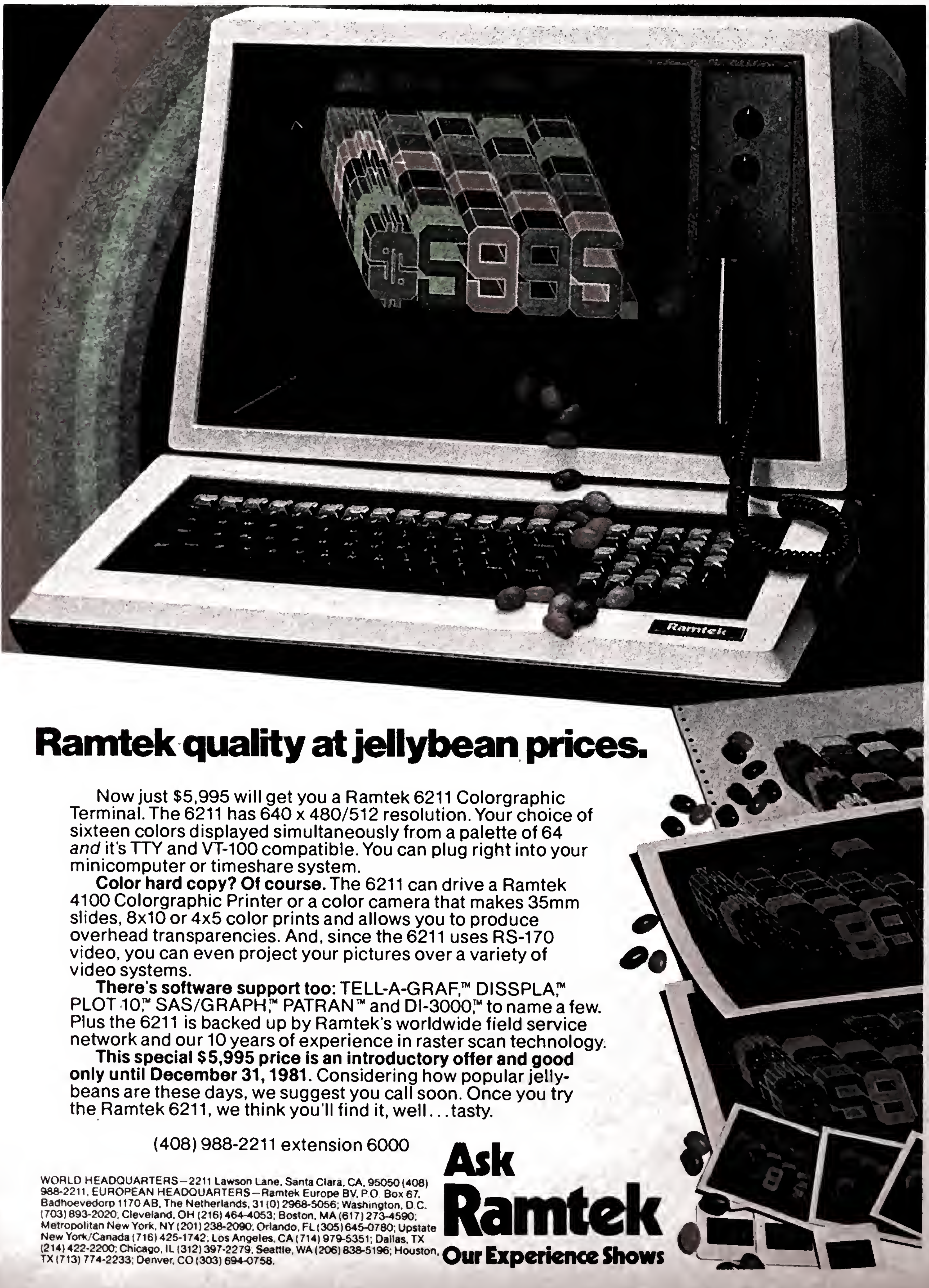
4. If the work-load characteristics tend to be unique to each node, and if tuning is complex, then the tuning function should be centralized if tuning is done within the same software packages for multiple nodes. If the work-load characteristics are unique and different systems are involved, then specialists in each system may be dispersed unless there is a sizable population of each system. If tuning is simple or noncritical, the function should be dispersed. A full-time performance staff may not be justified if tuning is a part-time job for each node, performable at a low skill level.

5. If operator functions are complex, then remote operator capability, even if purchased at the expense of user-developed code, is an absolute requirement. Programmed local operator capability may be useful to reduce the load on remote operators, but it will rarely completely eliminate some remote or network operator functions on systems consisting of significant general-purpose nodes.

Service Center Concept

An idea that seems to be maturing in the industry will allow business units and professional staffs to discover what the best operational environments might be. The approach involves a service contract, which a data service center signs with a business unit that has a computational node.

The business unit may receive certain contracted services for a class of nodes. A business unit may or may not be allowed to acquire or use a



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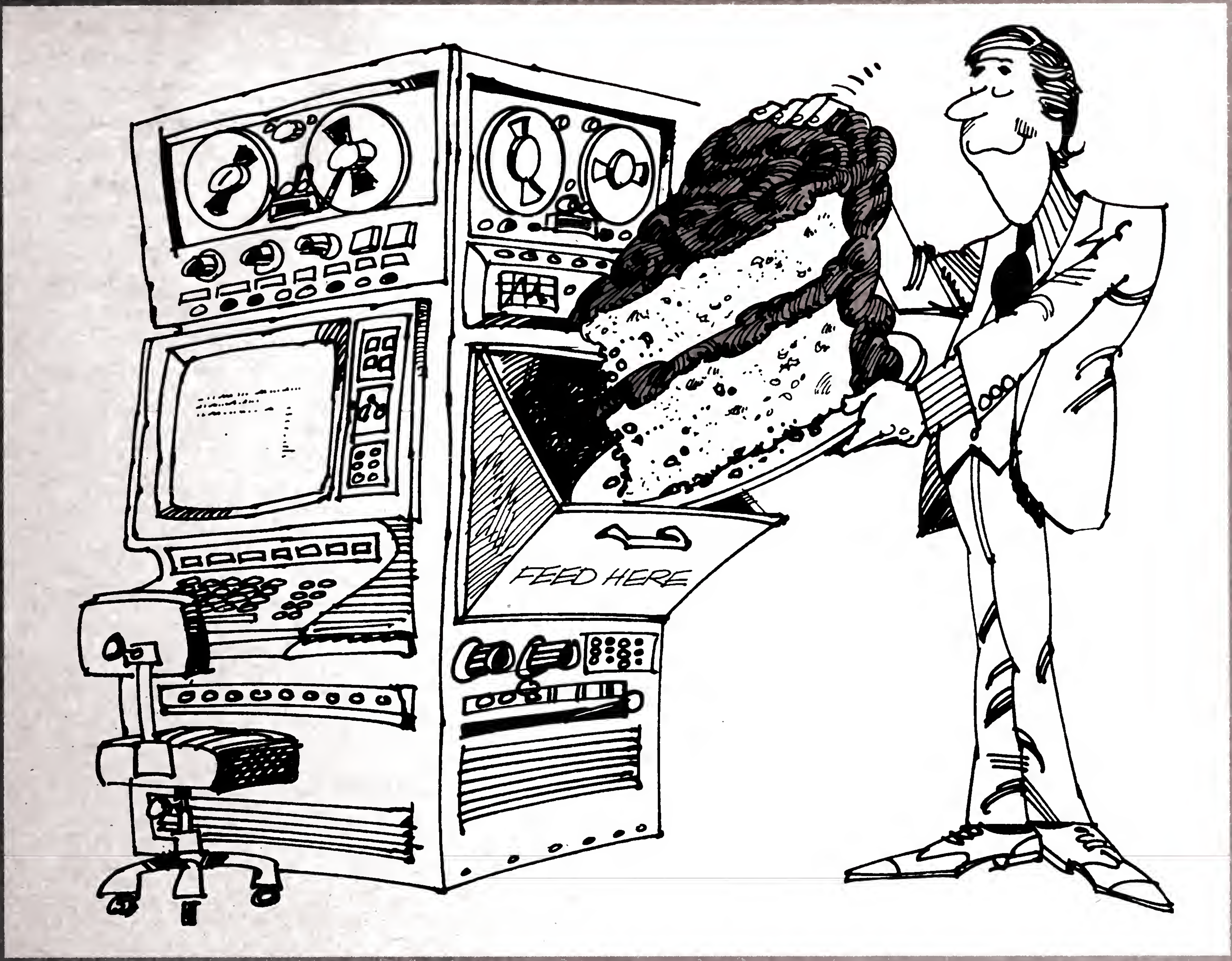

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nonstandard node. If it is permitted to do so, the business unit is completely responsible for the operation of that node. If the business unit elects (or is directed) to use a standardized environment, operational support is available from the service center.

Thus a business unit can elect to employ operators or contract for remote operation from the center. A business unit can decide to do its own performance analysis or contract from the center. The management framework is flexible in that the degree of autonomy and self-reliance in operations can be negotiated between the service center and the business unit. Tendencies toward entrepreneurial or centralized control may flavor the range of options available to a business unit that is to have a dedicated node.

In order to receive a service, the business unit must use one of the standard serviced nodes. If it does, it may contract with the service center for software configuration and installation, problem determination, performance analysis and floor operation. The business unit may also elect to undertake some of these functions on its own.

Service Machine

In some network plans, the service center is represented as a node on the network identified as the service machine. Network operation is a natural function to be embedded at the service center. Whether this would be done on a dedicated network control machine (or set of machines) distinct from the software support machine depends upon the complexity of the network and the stability of the software environment.

In a service center environment, some services can be offered within the context of an operational network. For example, backup and archival data services may be offered by the service center staff and machine. The placement of certain software products at a service center machine, for distribution as needed to business unit nodes, is another service that can be offered. In various forms, the service center machine may begin to acquire functions of a data node as well as functions of a system controller.

The total scenario, then, involves a professional staff of service personnel providing software support and operational function at a contracted level for those business units using standardized machines who elect not to have their own operational staffs. In order to accomplish this, some systems programming may be necessary on the part of the service center to establish the service center environment.

An important function of the service center would be to provide consulting services to help business units decide whether to use the center. Thus a flexible set of operational environments can be built around the hub of the service center facility, each business unit using unique software and having operational capability of its own as required by the details of its own system and work-load requirements.

About the Author

Harold Lorin is a member of the staff of the IBM Systems Research Institute where he develops and presents professional and graduate-level seminars and courses in computer management, use and design for senior IBM professionals. As a member of the IBM SRI staff, he also provides education and consultation within and without IBM for university and professional groups.

Lorin's 25 years of experience in the computing field includes a variety of professional and management positions in areas of hardware and software design and development. He was with Sperry Univac, the Systems Development Corp. and the Service Bureau Corp. prior to joining the IBM Systems Research Institute.

Lorin is the author of four books and numerous articles. Most relevant to the area of distributed processing is Aspects of Distributed Processing, *John Wiley and Sons, 1980. He is currently completing a book on computer architecture and design.*

He received his BS degree from New York University and has taken postgraduate courses at Omaha University, Queens College and the NYU Courant Institute.

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By Hans Zassenhaus

OFFICE TECHNOLOGY: TINKER TOY OR TOOL?

CW Photo by P. Segal

The rush is on to introduce newer and more sophisticated technologies into the office. These technologies are being introduced in ever larger doses in the name of improving managerial productivity. However, office productivity, especially the managerial kind, most emphatically must not be used as an excuse for bringing in "technological tinker toys."

More often than not, these technological masterpieces are introduced after direct (short-range) cost/benefit analyses. In general, these analyses assign low priorities to the effects on "people factors" and on long-term changes to the way a firm does its business. This article explores a few of these long-range implications.

To gain an insight into the perils of introducing advanced technologies into the office, the analyst must become intimately familiar with the goals of the organization, its mission and the means established to accomplish the mission.

The mission of most organizations is not to handle or generate paper, paper-related records or, for that matter, information. Organizational goals are normally expressed in more physical terms, such as producing a certain product, establishing a predetermined market share and making a profit. Managers are charged with the prime responsibility of attaining these goals through the efforts of other people — in short, by managing.

In all too many cases, office automation is approached in the same manner as the introduction of robotics in the manufacture of automobiles. For instance, a typewriter is replaced with a stand-alone word processor in the hopes that more characters can be transferred to a piece of paper or transmitted in less time with fewer people. This usually equated to increasing productivity, when in fact, this increases the proliferation of information —

mostly unwanted, unneeded and unnecessary — which must subsequently be processed by another part of the organization. The net result when the entire organization is taken into account is a fictitious increase in productivity.

The overall long-term result is an increase in the number of people doing the same amount of work vis-a-vis the stated mission. Eventually, productivity declines. In order to understand how this occurs, it is necessary to understand what is being replaced, how the replacement is actually implemented and by whom.

The general misconception is that hardware is the primary thing being replaced. This is not only erroneous, but is an excuse for justifying the installation of new equipment. In fact, when new hardware is installed, new office routines requiring new skills are also installed.

Office routines are implemented by people. To understand the effects of this truism, let's take a look at the impact of replacing paper communications systems with new technologies such as electronic mail, electronic messaging and some sort of word processing.

These technologies are normally installed for the following stated purposes:

- To increase speed.
- To ensure completed communications, even if the recipient is not present to accept the communication or does not acknowledge receipt, such as elimination of the "telephone tag."
- To reduce manual operations associated with paper-based communications.
- To facilitate manager-to-manager communications.

The implementation of electronic paper-replacement systems satisfies the short-range requirements of both the sender and recipient, normally to the detriment of other portions of the organization. Let's explore some of the people problems inherent to office systems which are to some extent obscured by the implementation of electronic message systems.

Archiving Mechanisms

Paper communications normally end up in some sort of retention system. In some cases, the paper is destroyed after a relatively short time period, say one year. However, in electronic systems it may not be possible to capture some messages if the message system does not support an archiving mechanism. The archiving mechanism may require output to paper. If so, an office worker will review the output, adding identification codes or other information to support subsequent operations such as filing.

These identifications are part of a normal interoffice letter produced by nonelectronic mail systems. Even if electronic files are used, some form of identification is required to ensure consistent retrievals. Additional time is spent.

In some systems, it is not possible to archive *all* messages, but only those the originator and/or recipient desires. This will have legal implications in some applications, because complete historical records of a decision or action will not be properly documented to satisfy either corporate or regulatory requirements.

Message Forwarding

How will message forwarding be handled? If the addressee is on vacation, for example, what will happen to the message? In the paper system, the secretary reviews correspondence and forwards it to another person if the addressee is absent. Provisions can be made in an electronic system whereby the secretary will review all messages received and make use of the system's message-forwarding features. This is a reasonable approach, provided that the system does not support highly confidential material, in which case system security is broached.

A similar scenario will present itself when the number of messages received by a single addressee is excessive. In paper systems, the secretary reviews all the mail and arranges it in a priority consistent with the manager's instructions. Again, this can be handled by having the secretary review the messages and assign priorities for the manager.

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technological solutions. However, it will take people to implement the revised procedures.

Procedures in the automated office will be more complex as the tasks will be more complex. The human ability to adapting to unforeseen and unexpected situations is not easily replaced by the computer. Thus, office procedures will rely more heavily on organizationwide, standard methods of operation. New standards must be imposed on managers as well as office workers.

This change will not be well-received. Managers using electronic messaging systems will be required to make decisions such as composing subjects that support indexing and filing systems. They will have to input information that will facilitate routing the information and the like. In effect, the managers become both the creators and handlers of interoffice mail. In paper-based systems, on the other hand, the more mundane tasks relating to information handling are relegated to the "clerks."

New Level of Training

In the short run, implementation of electronic office systems will appear to increase productivity. In the long run, however, there could be a serious decrease in productivity unless all the changes to current office routines are fully understood and analyzed. In addition, any changes to the current method of operation will be strongly resisted by both managers and office staff. Breaking down this resistance will require a new level of training.

Current training is normally limited to a system's physical operation. Very little training is provided in its overall operation.

All persons involved with the new system must be indoctrinated in new procedures and the reasoning behind these procedures. The major thrust of the training will be directed toward the concept of the entire organization, not just one segment of it. Training will emphasize an understanding of the impacts of incorrect or missing information on other functions within the organization. As the net result, all persons on the system and their support staffs will become more highly skilled.

Training Burden

Many graduates from both secondary schools and colleges have not been well prepared for this increased skill requirement. This places an additional training burden on the organization. Automated office systems are not as tolerant of mistakes as manual systems. Thus, highly skilled and trained professionals must spend more time in detecting and correcting errors.

If organizations fail to implement comprehensive training programs, the new automated offices will operate in a person-dependent mode. They will operate efficiently only as long as the original personnel stay in their jobs. New hires will not be as highly skilled and, thus, will be less productive, resulting in the hiring of more people than is necessary.

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will increase more rapidly the longer a system is in place. In today's environment, where changes and enhancements are announced and implemented almost monthly, the cost of maintaining the training program will increase.

This will again require a larger staff. It will also be necessary to conduct periodic update sessions for all the users as enhancements are implemented. In short, once the road to automated offices is started, the training function becomes an integral part of any organization.

In implementing the newer technologies, the organizational structure of a firm will also change. This is not an overriding concern at the time a new system is implemented. However, it is a long-range cost that must be borne by the company.

For instance, the concept of word processing has led to the establishment of separate departments that require management expertise and technical skills not originally anticipated.

Trial and Error

For the most part, implementation of word processing has increased overall office productivity, but not without a good deal of expensive trial and error. This experimentation with both hardware and organizational structure has been expensive. Such costs were probably not incorporated into the original cost/benefit analyses, which assumed a direct replacement of the secretarial pool.

For many organizations, the impact on overall operations was not considered. New procedures were established which resulted in the standardization of type fonts and typing formats. Special symbols were mandated on document originators to instruct word processing operators how and where to make corrections. These procedures were in fact a new series of standards for the entire organization. This process was evolutionary, not revolutionary, and the same will be true for any further ventures into the office of the future.

Decision Support Systems

Now, let's examine the use of decision support systems in the manager's office. Following are some points firms should consider before giving managers access to the various information banks.

Within any company today, data element definitions pose an area for concern:

- What does the term "date" mean — receipt date, approval date, run date?
- How does the data base administrator convey the exact meaning of this information to the manager so that the data is not misinterpreted?
- Is the data consistent and/or correct enough for the intended application?
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saged by people. These people require new skills and support in the form of training, procedures, hardware and standards.

These long-range implications must be understood by the systems analyst. But more important, they must be understood by the manager. The impact on both system efficiency and the organization's basic mission must be analyzed. This is a difficult task, and the results cannot be left to chance or a de facto decision. The costs involved in changing entire corporate operations are too large.

Introduction of advanced technologies and hardware into the office *can* benefit people and their work habits. If the long-range implications of this office revolution are properly understood, people can become more productive.

The current emphasis on managerial productivity will involve office workers in establishing new operating procedures. Increasing skills levels will provide a powerful tonic to the morale and self esteem of the office worker. People will feel that they are contributors to the organization's prime mission and not just paper pushers. In large measure, people will develop pride in mastering the computer. If fewer people are involved and each is trained in more than one function, their sense of participation will increase.

Analyzing and implementing advanced technologies in the office will provide some unexpected benefits. Managers will gain an increased appreciation of the office and be more sensitive to the ways in which their actions might disrupt office routines. A smoothly running office is like a good clock.

Involving Managers

Managers often take office functions for granted, but the process of automating office functions will involve managers in these functions. Analysts and computer professionals will also gain appreciation of the office as a complex series of systems. The experience of implementing advanced technologies will provide a forum for interchanging thoughts and techniques with people most familiar with office work.

Office mechanisms are not ordered and logical, but highly complex living functions. Realization of this fact will force the system's professionals to acquire an understanding of those functions.

Jobs that currently are tedious, repetitious and "make-work" will be replaced by implementing advanced technologies.

Analysis of office procedures prior to the introduction of the new technology will expose any "make-work" practices that have built up. Elimination of extraneous operations and functions will free "knowledge" workers to use their unique human capability for reasoning and judgment.

Summary

In summary, the success of future office environments will depend solely on office workers and their support.

Organizations will have to retrain and remotivate all personnel involved in or affected by the office of the future. Only then will people rise to the occasion and contribute to an overall increase in productivity.

On the other hand, introducing technological tinker toys without considering the long-range organizational and human impact can lead to disaster.

If equipment is replaced in the name of the "office of the future," but without planning, an organization might be in for a dramatic decline in productivity, not to mention an office workers' revolt against the use of technology.

About the Author

Hans W. Zassenhaus is manager of the Records Management Division of Stone & Webster Engineering Corp. in Boston. He is responsible for the design and implementation of records systems supporting both corporate and project operations.

A graduate of George Washington University, Zassenhaus has been with Stone & Webster since 1969 in both construction site and headquarters assignments involved with office and records systems.

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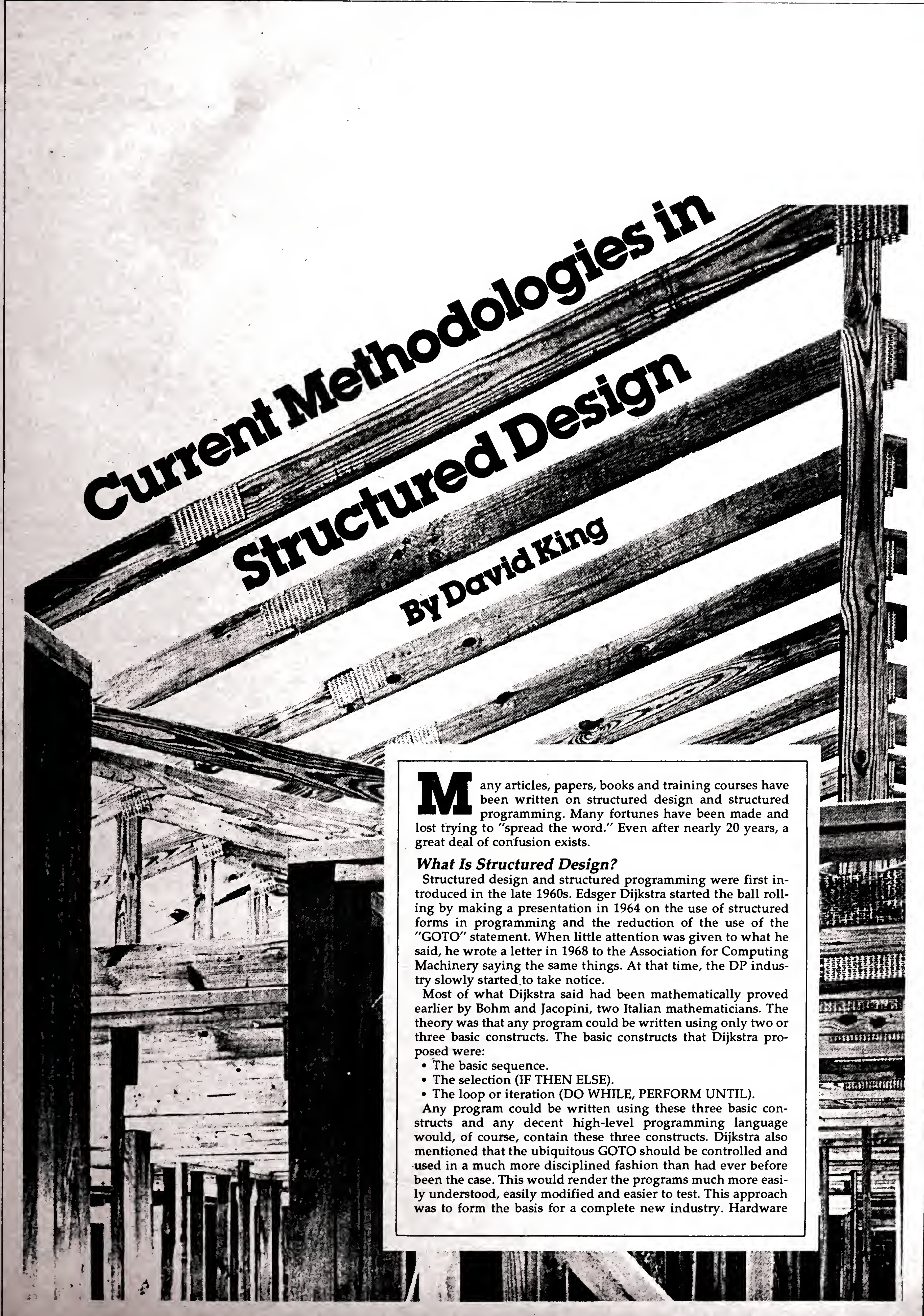
Current Methodologies in Structured Design

By David King



Many articles, papers, books and training courses have been written on structured design and structured programming. Many fortunes have been made and lost trying to "spread the word." Even after nearly 20 years, a great deal of confusion exists.

What Is Structured Design?

Structured design and structured programming were first introduced in the late 1960s. Edsger Dijkstra started the ball rolling by making a presentation in 1964 on the use of structured forms in programming and the reduction of the use of the "GOTO" statement. When little attention was given to what he said, he wrote a letter in 1968 to the Association for Computing Machinery saying the same things. At that time, the DP industry slowly started to take notice.

Most of what Dijkstra said had been mathematically proved earlier by Bohm and Jacopini, two Italian mathematicians. The theory was that any program could be written using only two or three basic constructs. The basic constructs that Dijkstra proposed were:

- The basic sequence.
- The selection (IF THEN ELSE).
- The loop or iteration (DO WHILE, PERFORM UNTIL).

Any program could be written using these three basic constructs and any decent high-level programming language would, of course, contain these three constructs. Dijkstra also mentioned that the ubiquitous GOTO should be controlled and used in a much more disciplined fashion than had ever before been the case. This would render the programs much more easily understood, easily modified and easier to test. This approach was to form the basis for a complete new industry. Hardware

Ask a financ
about its

We did. We asked people at banks, savings and loans, savings banks, credit unions, and companies that offer information processing services to financial institutions. And whether they commented on our MCP, "the most advanced operating system available from any vendor" (see First National Bank of Cortland, New York, below), or the total systems support available through Burroughs (see Alaska Statebank), the response was almost universal: satisfaction. Satisfied users, like those listed here, are one of the strengths of Burroughs.

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C. Keith Swaney, V.P. of Operations
Park View Federal S&L Assn.
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"Burroughs provides us with total system support—from all equipment needs to system needs to forms needs. They assist with research, definition, design and implementation, professionally and on time—a real asset to an institution of our size with limited in-house resources.

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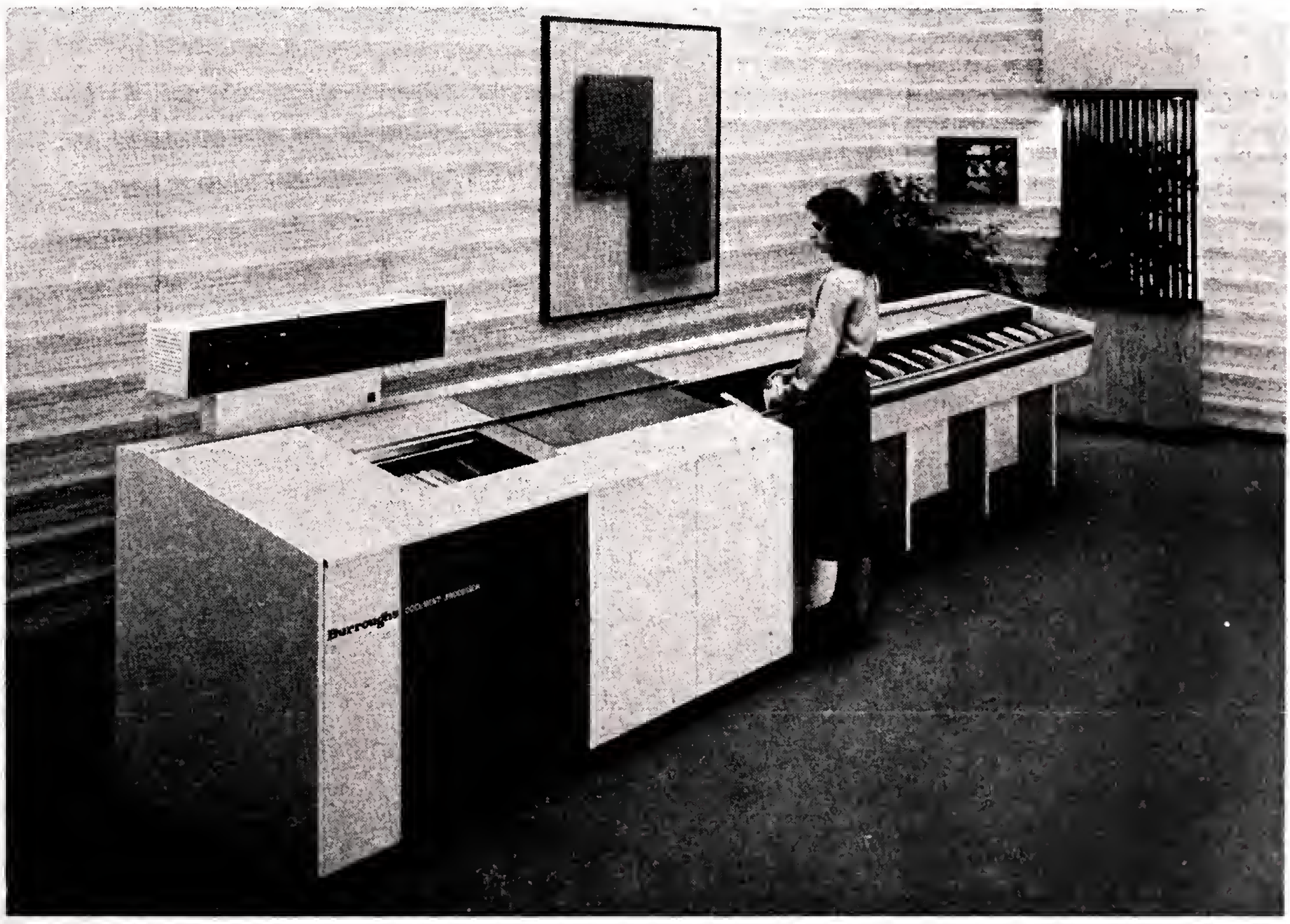

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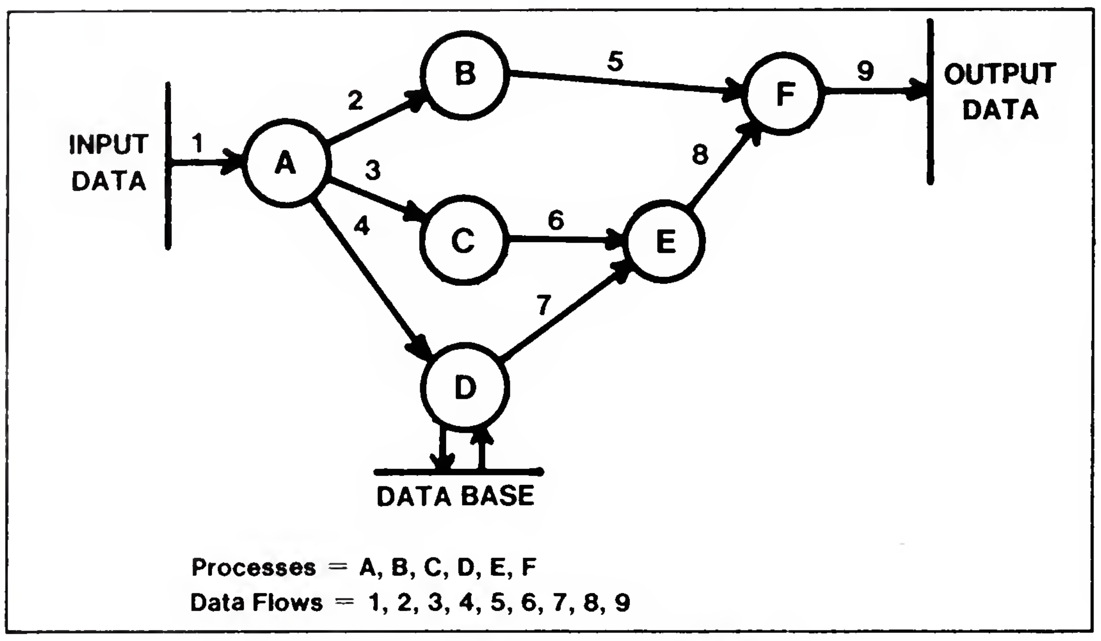
INPUT DATA
1
A
2
3
4
B
C
D
5
6
7
8
9
E
F
OUTPUT DATA
DATA BASE
Processes = A, B, C, D, E, F
Data Flows = 1, 2, 3, 4, 5, 6, 7, 8, 9

Figure 1. A Data Flow Diagram

and software manufacturers jumped on the bandwagon to use and to market the new methodologies. Many different design techniques arose from the basic series of statements, but most of them used Dijkstra's three structured forms.

In the 1960s, stepwise refinement was mentioned by Nicklaus Wirth, who is famous for a number of well-read programming books as well as for much of the early development of the Pascal programming language.

Stepwise refinement simply means declaring the solution to a problem — perhaps a programming problem — in very simple, broad English-language statements and then gradually taking each of those statements and breaking it down into deeper and deeper levels of detail. Finally, at the lowest level of detail, the English-language statements produced can be translated into program language statements. Stepwise refinement is also sometimes referred to as top-down development.

At the lowest level, these English-language versions of a program are often referred to as "pseudocode" or "structured English" and are very useful as a final check of the program before coding starts.

Even with all of these new tools for development and implementation, there was still an initial problem of how to start. Even with programs that only contained sequences, loops, iterations and few GOTOs, it could still be said that the initial shape of the solution was wrong. That inaccuracy would be compounded and developed further and further down into the details of the program to produce a completely wrong solution. Many people and many organizations spend many millions of dollars attempting to develop a methodology for coming up with the correct "shape" of the solution early in the development life cycle.

Today, there are still two main schools of thought: proponents of the data flow method and proponents of the data structure method.

Data Flow

The data flow method of program analysis and design was first formulated by Larry Constantine and picked up in later years by IBM through Glen Myers and still later by Ed Yourdon.

Yourdon is the most successful protagonist of the data flow methodology of systems and program design, and from him many offshoot companies and theorists have developed. The most notable of these are Chris Gane and Trish Sarson, who have formed their own company called Improved System Technologies, Inc. (IST). (IST was acquired by McDonnell Douglas Automation in February 1981.) Softech Corp. of Boston has developed its own methodology, Structured Analysis and Design Techniques (Sadt), from the data flow theory.

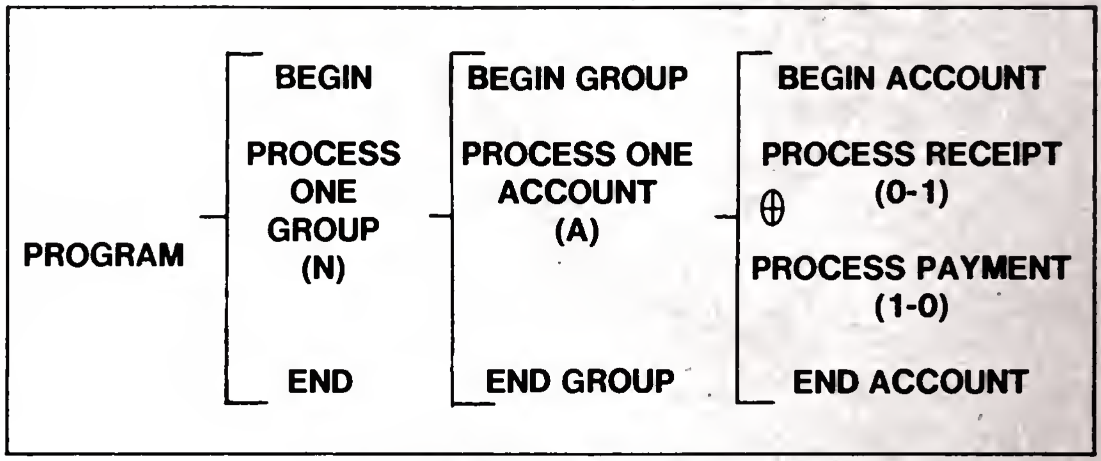

Figure 3. A Warnier Diagram

Data Flow Diagrams

Basically, the idea of the data flow methodology of systems and program design is to start analyzing the system by drawing diagrams known as data flow diagrams (DFD). DFDs are also known as data flow graphs and bubble charts (see Figure 1). Very simply expressed, a DFD consists of a series of bubbles joined together with lines.

The bubbles represent the processes of data transformation that need to be taking place in the system and the lines joining the bubbles represent the data that flows between the processes.

After the system has been completely described by means of bubbles and lines, a decision must be made as to which is the central or main transformation (or bubble). Hierarchical structure diagrams are then used to describe that particular process or transformation.

The other bubbles or processes in the system are added to the left or to the right of the hierarchy, depending upon whether they are input or output processes (see Figure 2).

Effective Methodology

This methodology is very effective, particularly when the required design is not clear and the user and the developer need to have a notational language in which to communicate. Data flow diagrams, after an initial explanation, are relatively easy to understand.

One problem with the data flow diagramming method is that it does normally require a large number of iterations to arrive at the "most correct" solution. In addition, the data flow diagram does not provide the shape of the individual processes in order to come up with an accurate structure diagram for each individual program.

Data Structure

The main protagonists of the data structure methodology were Jean-Dominique Warnier from France and Michael Jackson from the UK. Their premise was that most data processing systems are actually processing data, as the name implies. Therefore, the shape of the process itself should resemble very closely the shape of the data.

If there were some way of merging the input data structures with the output data structures, they theorized, then that merging should result in the shape, in structural form, of the program itself.

Another premise behind this methodology is that what the process is really transforming is the logical structures, not necessarily the physical structure, of the data.

Armed with these two premises,

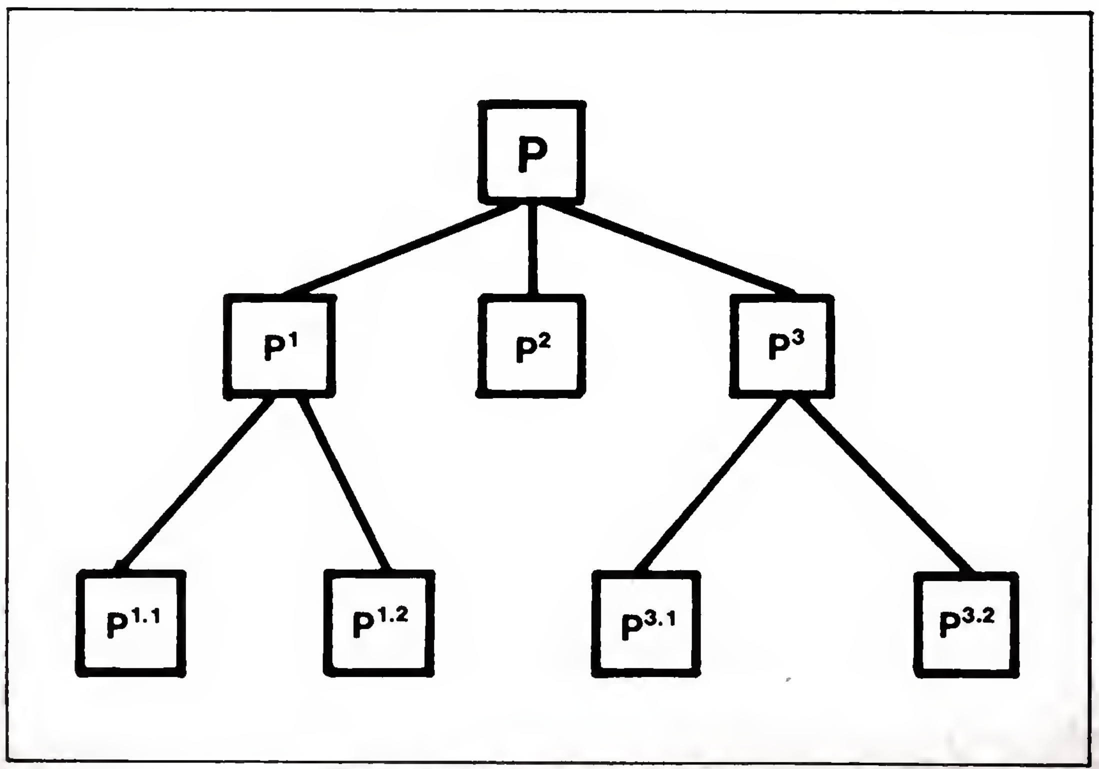

Figure 2. A Structure Diagram

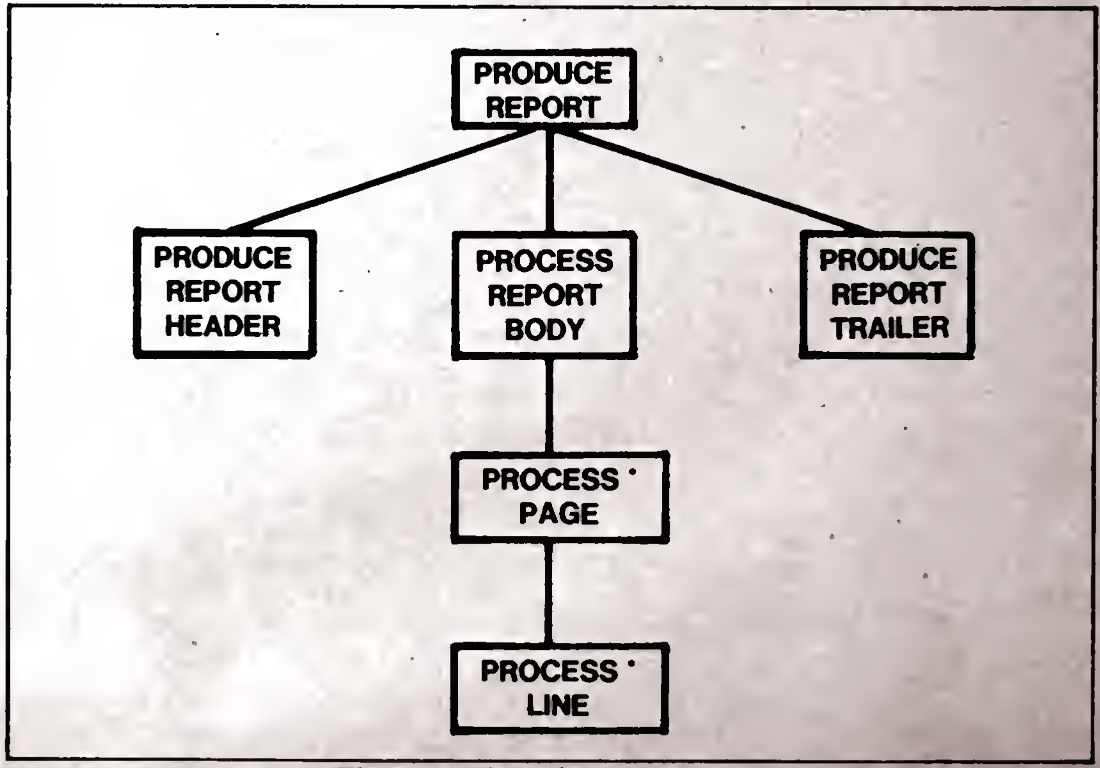

Figure 4. A Jackson Diagram

Jackson and Warnier independently came up with very similar methodologies for developing programs and systems.

The Jackson/Warnier methodology is very procedural. It consists of five or six steps for developing simple and complex programs. Provided the logical structure of the data is fairly definitively known, it will come up with an accurate representation of the program every time and will postpone the detailed programming language requirements until very late in the development process (see Figures 3 and 4 on In Depth/26).

The one disadvantage of the data structured methodology is that the logical structure of the data must be known fairly clearly before design of the program is begun. Unfortunately, in many large system design activities, these logical structures are not known until some time through the development life cycle. Therefore, a less specific methodology must be used at the start.

It should be noted that whatever methodology is used, it will almost inevitably produce more documentation than has hitherto been produced by "traditional" methodologies. These traditional methodologies are, in fact, nonmethods and do not produce any real documentation, resulting in the enormous maintenance burden of today's data processing systems. Each time any maintenance or enhancements have to be made to an "old" system, a redesign process is necessary because no backup documentation is available for the old system.

The premises of structured programming originally put forward by Dijkstra in the mid-1960s can be applied to all the current structured design methodologies. In particular, using the data structured design methodology, it is almost impossible to code a program designed without using the rules of structured programming.

The above is merely a summary of the most popular design methodologies being used today. It is likely that in any real-life situation, a combination of these would have to be used, resulting in the following combination:

At the top level, the data flow graphing method could be used to define the main functions in the system as bubbles or processes. Each of those bubbles could then be taken as an individual program and a more specific non-function-based methodology could be used to design them (Jackson or Warnier methodology).

At the lower levels, rules of structured coding using the three or four basic constructs could be modified to fit the local environment and local programming language to produce the finished product. Prior to actual coding, a pseudocode or structured English version of the program(s) should be produced as documentation and for a technical review of the program design.

In sequence, the specific techniques that would be used are as follows:

1. Data flow diagrams.
2. Structure charts.
3. Data structures to form program structures.
4. Pseudocode or structured English.
5. Structured coding rules.

Terminology and Generalities

The term "analysis" is often and popularly used to describe a stage in the development process that precedes design. It is generally agreed that this first stage should result in a nonprocedural description of what the software to be designed should do — requirements specification (or requirements definition). This requirements specification is agreed upon by the design team and the software users before work on design commences.

There has been less success in formalizing this stage of the development process than in formalizing the succeeding stages. For most installations, requirements analysis and specification are regarded as an area of research from which useful insights and ideas may be called, but from which it is as yet too early to look for entirely satisfactory procedural methods.

Requirements Specification

The general problem of requirements specification methods is that,

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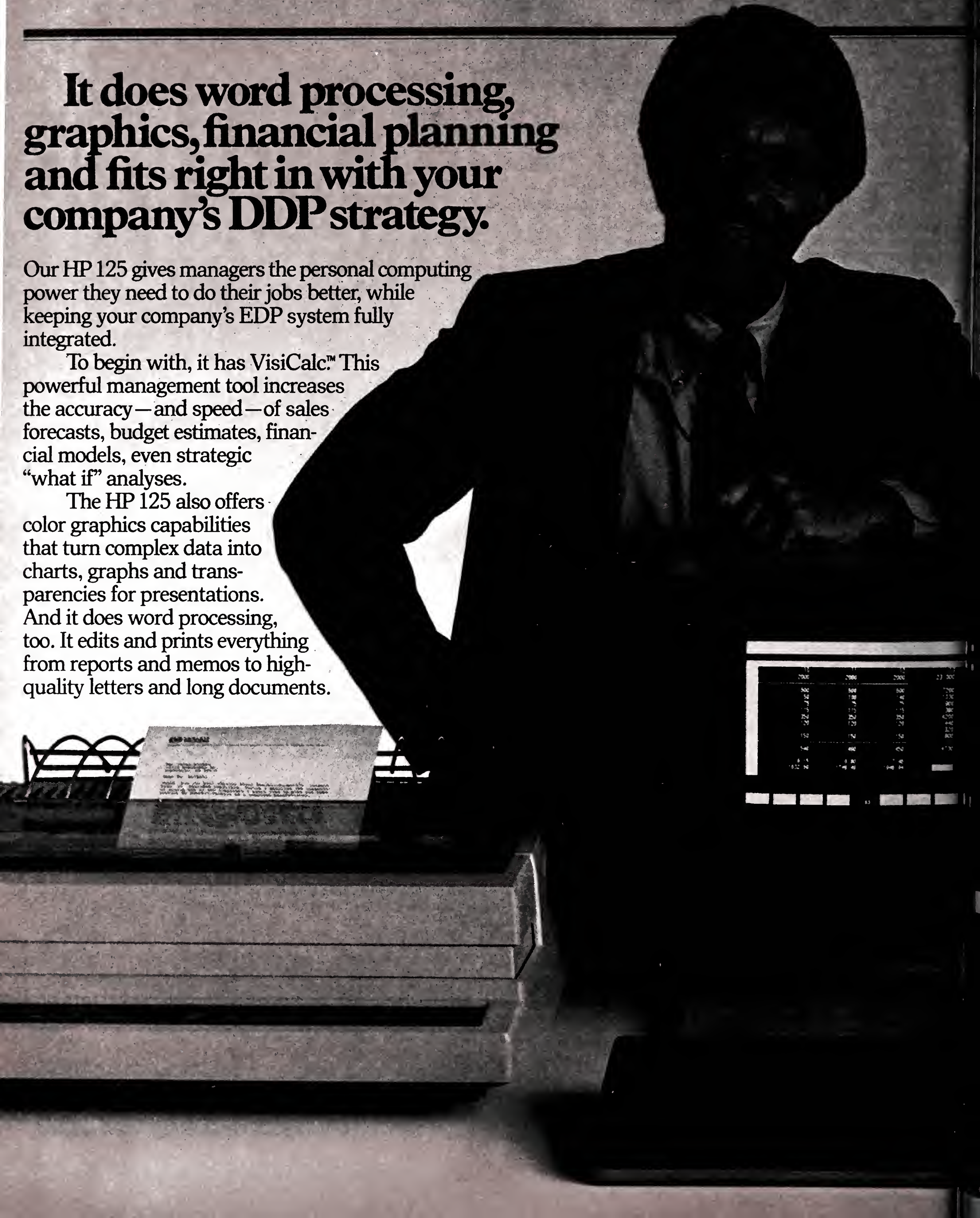

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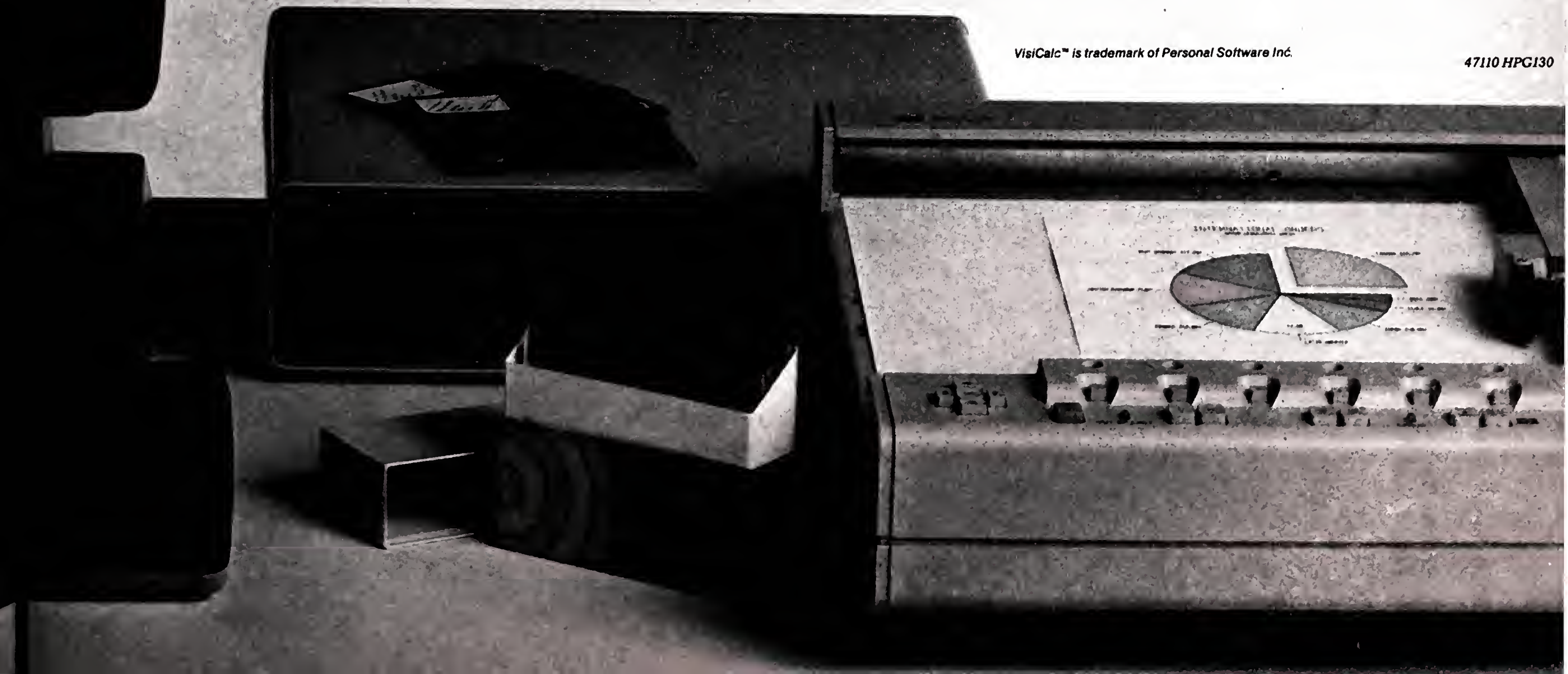

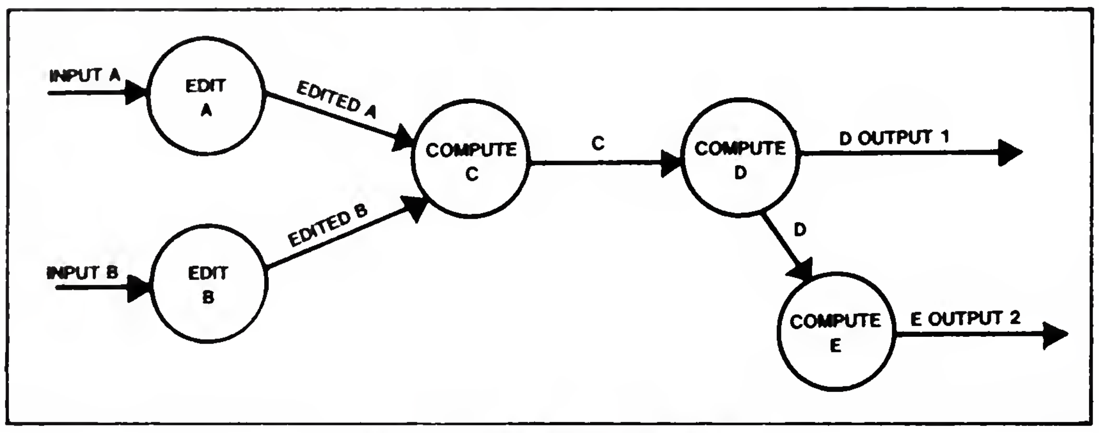

Figure 5. Data Flow Diagram

ideally, they should be precise and yet comprehensible to the user. It should also be possible to process requirements statements automatically, so that logic and consistency checks can be made. The first and last of these criteria tend to conflict with the second because they imply a formal, detailed requirements language that the user will have to learn to understand.

Some of the current documented attempts to produce requirements analysis and specification methods that meet these criteria include:

- Software Requirements Methodology, produced by TRW, Inc.
- Problem Statement Language/ Problem Statement Analyzer (PSL/ PSA), part of the Isdos project from the University of Michigan.
- Sadt, produced by Softech.
- Structured Systems Analysis — Ganes and Sarson (McAuto)
- Structured Analysis and Specifications — Tom De Marco.

Many other methods have been proposed, although few are used to any significant extent. Many are simply a formal checklist of the steps to be taken in the requirements analysis and specification process; others are diagramming conventions that are useful but inadequate in themselves. Effectively, they are the result of a trade-off in favor of easy comprehension on the part of the user while having the merit of not requiring the investment in training (and in machine capacity) required by the more precise methods listed above.

A growing practice is the use of high-level design diagrams as a pseudospecification method. If an initial outline design can be produced quickly and easily, it can be practical to check this with the user and simply iterate until an agreed outline design is achieved. Some design methodologies lend themselves to this approach; it can often be an adequate compromise.

Design Techniques

The basis of most "structured" design techniques is the attempt to reduce complexity. Faced with a problem too large to handle, the system or program designer seeks to break it into a series of smaller subproblems that he can handle. Many catchwords have been used to encapsulate this process: "divide and rule," "separation of concerns," "functional decomposition" and so on. However it is described, the idea is the same: To reduce a problem to manageable size by subdividing it into smaller portions.

This subdivision of a program system into smaller units is often called modularization or decomposition; the units into which programs are divided are often called modules or segments. No precise definitions of these terms are possible, but the general philosophy is commonly accepted: structuring in such a way as to reduce the total amount of intuitive reasoning that is necessary.

Although one purpose of modularization is to reduce complexity, if carelessly applied, it can have exactly the opposite effect. For example, if a module attempts to handle too many functions, its logic can be completely obscured by the tests that are required for distinguishing each function. Similarly, if one module is allowed to interfere haphazardly with the data used by another module, the behavior of the two modules together can be completely unpredictable.

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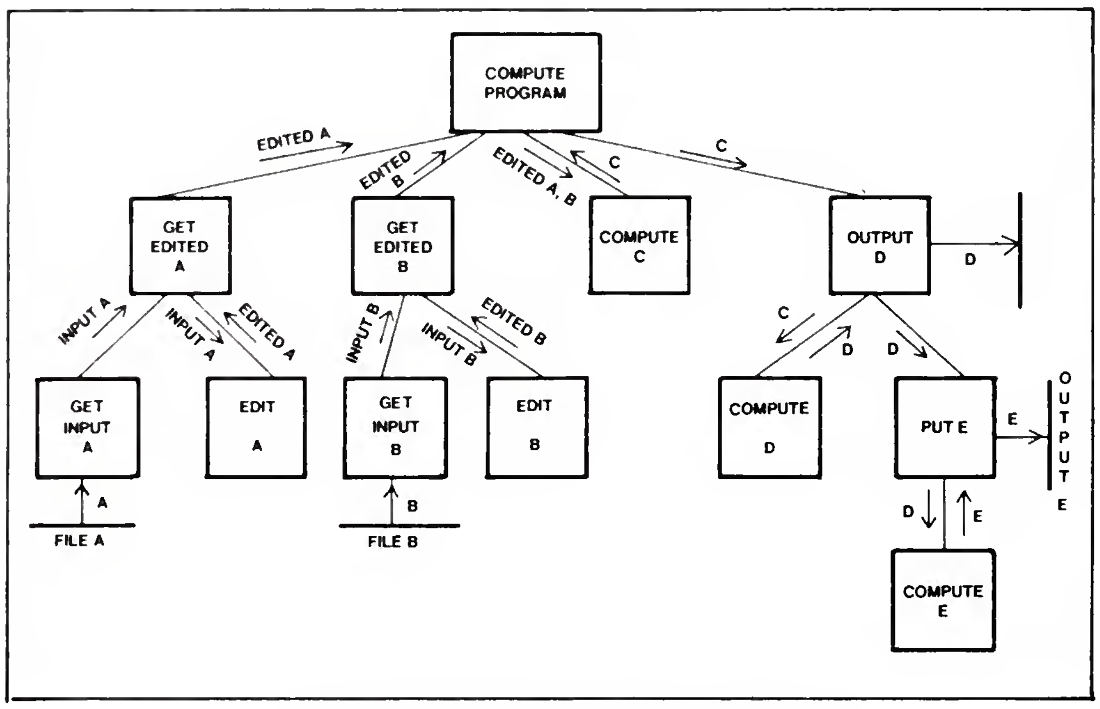

Figure 6. Example of a Structure Chart

Before discussing structured design methods in detail, therefore, we should examine the aims, techniques and limitations of modularization.

Modular Programming

Different authors provide different criteria for modularizing a program. For example, a module may be:

- A subroutine or group of related subroutines.
- A single work assignment for one programmer.
- A separately loaded segment or program.
- The implementation of an abstract data type.
- A separately compiled unit.
- A unit of code common to several programs.
- Fifty lines of code!

To understand which of these modularization criteria are useful tools, the reasons for modularization must be examined carefully.

Why Modularize?

The original practical need to have some kind of method for dividing a large program into separate work assignments is partly overshadowed by the reduction-of-complexity argument that applies equally to structured programming practice. Other pressing advantages of the modular approach lie in the area of program maintenance.

• *Reduction in Complexity:* As Dijkstra pointed out, one early motivation for modularizing was the need

Summary: "Yourdon" System Development Life Cycle With Deliverables

1. Survey:
- Identify Current Deficiencies.
- Establish New System Goals.
- Generate Acceptable System Scenarios.
- Prepare Project Charter.

Deliverable: Project Charter

2. Analysis:
- Document Current Physical System.
- Derive Logical Equivalent.
- Define New Logical System.
- Establish Man/Machine Boundary.
- Perform Cost/Benefit Analysis.
- Select Option.
- Constrain System.
- Package Specification.

Deliverable: Structured Specification

3. Design:
- Derive Structure Chart.
- Evaluate Structure Chart.
- Design Modules.
- Design Data Base.
- Package Design.

Deliverable: Integrated System

4. Implementation: (Top-Down and Iterative!)
- Select First (Next) Module.
- Code First (Next) Module.
- Test Skeletal System.

Deliverable: Integrated System

5. Acceptance Test Generation:
- Generate Test Plan.
- Prepare Performance Tests.
- Prepare Normal Path Tests.
- Prepare Error Path Tests.
- Package Tests.

Deliverable: Quality Assurance Test

6. Quality Assurance
(Acceptance Tests)

Deliverable: Accepted System

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- Job Cost Reporting

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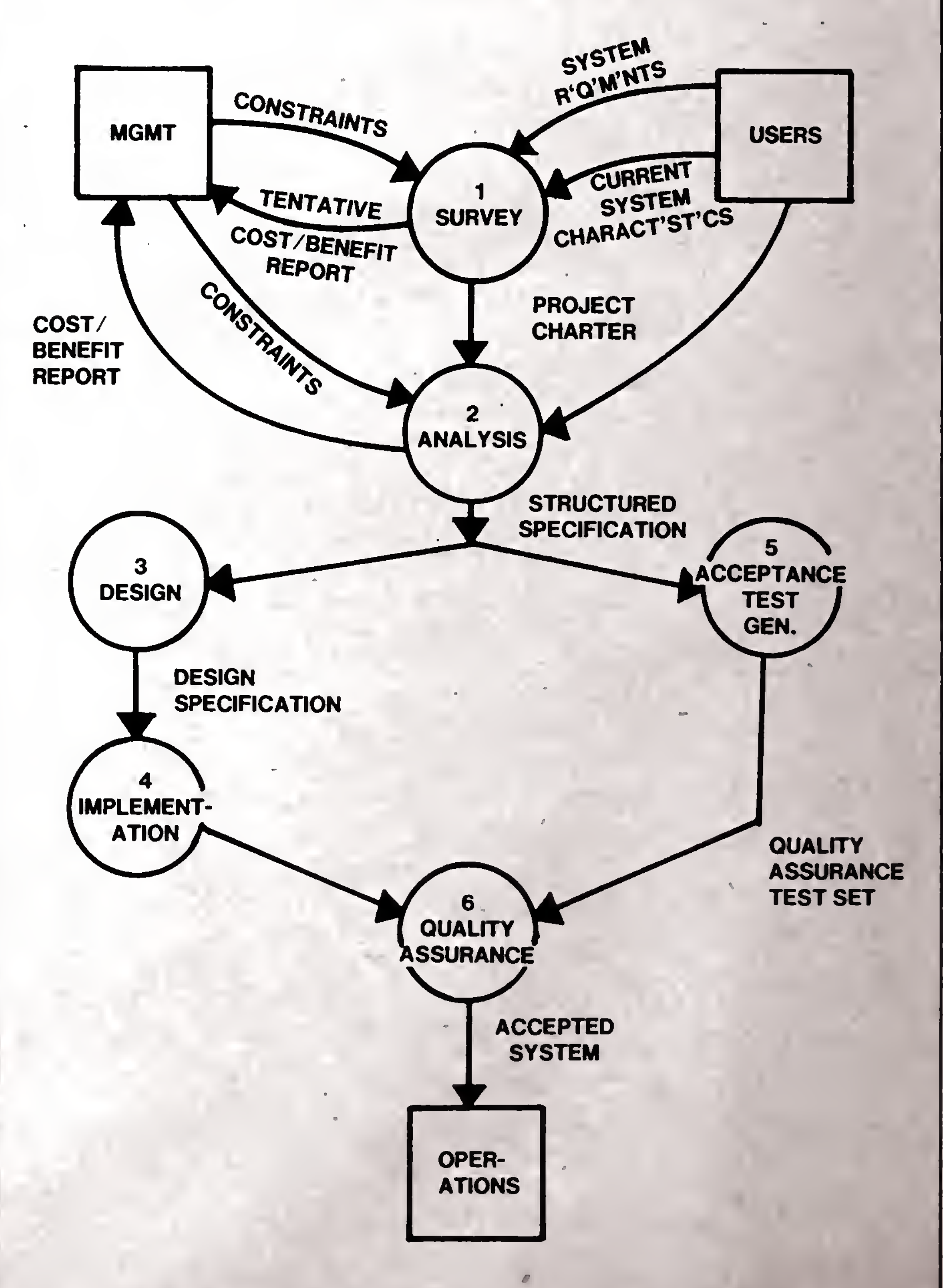

Figure 7. Simplified "Bubble Chart" of Yourdon Life-Cycle

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First there was the Dumb Terminal® video display, a legend in its own time.

And now there's the Hummm Terminal™ Printer, a quiet revolution that's causing quite an uproar in the printer industry.

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		25% of Pg. Printed	50% of Pg. Printed	dBA
LSI 310A	180	960	811	56
DEC LA120	180	914	748	65
TI 810/820 RO	150	576	576	70
Centronics 704	150	582	582	65

But the Hummm Terminal isn't just quiet. It also gives you the fastest throughput around. In fact, it leaves the competition in the dust in typical applications, such as reports, tab runs, order entry, inventory, and other documentation.

HOW IT'S BUILT IS WHY IT'S BETTER.

Fine engineering is the key. The Hummm Terminal features logic-seeking 180 cps bidirectional printing. Space and blank character compression. High-speed slewing over spaces (most other printers don't speed up over spaces at all). And it can dump a full CRT screen instantly with its expanded buffer.

The Hummm Terminal is built to the same high specifications that made the Dumb Terminal the standard for an entire product category. What's more, the Hummm Terminal's print head is good for ¾ billion characters—3 to 4 times the competition's best. Which means less head replacement and maintenance costs for you.

FEW OPTIONS. A LOT OF STANDARDS.

You also get superior printing, including true lower case descenders and underlining, good for an original and five crisp copies on multipart forms. Not to mention a 9 x 7 character field standard (optional 9 x 9 or 9 x 12 for continuous printing), and optional foreign character fonts. And, naturally, the Hummm Terminal complies with FCC regulations.

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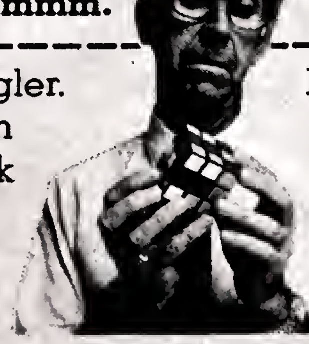

Hummm, Lear Siegler. You've certainly given me something to think about. I asked my distributor about the Hummm Terminal.

Here's his name along with my business card. (I realize that I can't get a Hum³ if I don't include my card.)

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Distributor ____________________
Distributor Sales Rep____________________
Distributor Location____________________
Distributor Telephone____________________

Lear Siegler, Inc., Data Products Division, 714 North Brookhurst Street, Anaheim, CA 92803. Attn: Adv. A

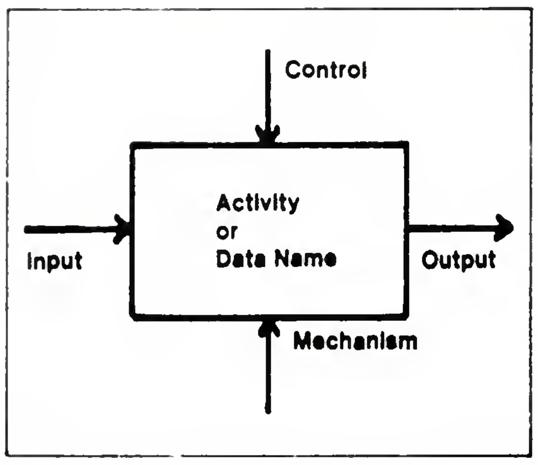

Figure 8. Basic Diagramming Unit

to cope with the complexity of large programs by splitting them into intellectually manageable units. There is so much detail in even quite a modest program that some device like this is needed to make the parts of a program comprehensible. Many of the modularization methods that have been suggested have the incidental effect of reducing complexity by cutting down and systematizing the interactions between the different modules.

- *Task Subdivision:* Another reason for modularizing, often of greater practical importance, is that of dividing a large programming project into a number of separate work assignments. This was, in fact, the consideration that initiated many studies of modular programming techniques; some startling improvements in programmer productivity have been reported as a result.

Such a subdivision works well, from a management viewpoint, when the interactions between the modules are minimized. This suggests that the modularization criteria for effective task subdivision are often the same as those suggested by the need to accomplish a general reduction in complexity.

- *Program Maintainability:* The question of the maintainability of programs, while easily overlooked, is often more important (taken over the whole life of a software product) than the task subdivision originally used in its production. Every substantial software product requires modification during its life, if only to accommodate the increasing demands of its users.

The problem with this kind of modification (which has become known as program maintenance) is that the overall integrity of the product tends to degenerate, making further maintenance correspondingly more difficult. Modularization criteria have been developed to relieve this problem to some extent. These limit both the number of modules affected by a potential change and (as a result) the degradation of overall system structure attributable to such change.

When programs are modularized in this way, a number of other benefits accrue, such as programs that are easily extendible; programs with useful subsets and families of programs; and the simplification of the production of programs to be available in several related versions.

- *Program Correctness:* Quite a different consideration concerns proofs of program correctness. Unfortunately, this still has the status of a theoretician's device rather than that of a practical software tool. The problem is that correctness proofs tend to be so complicated that they can be as hard to verify as the programs they ostensibly concern.

The only way this situation is going to change is if programs can be broken up into simpler fragments for correctness proving purposes. This again suggests a modular approach. These considerations are rather far removed from the world of the software manager at present, not only for the reasons just outlined, but also because the decomposition of a program required by a correctness proof is conventionally based on a fragmentation of the program's overall flowchart. This is often not a good way to modularize.

What constitutes a good modularization? Approached from the point

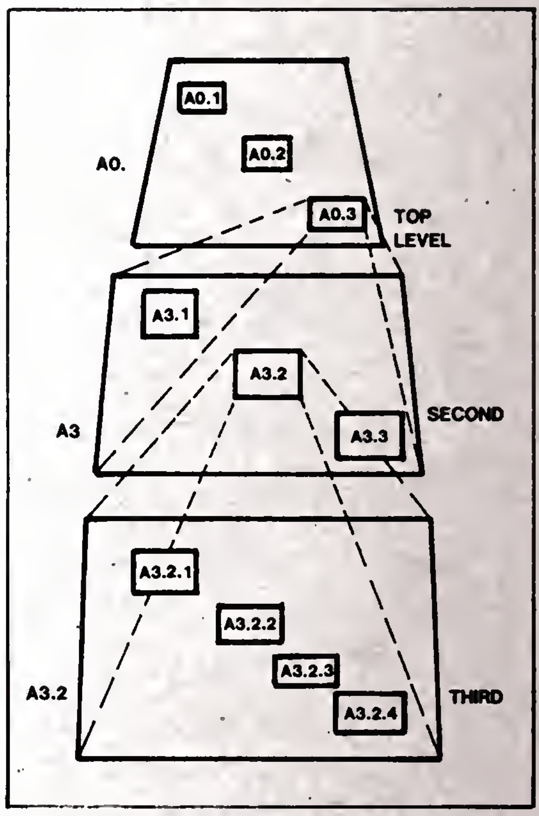

Figure 9. Decomposition

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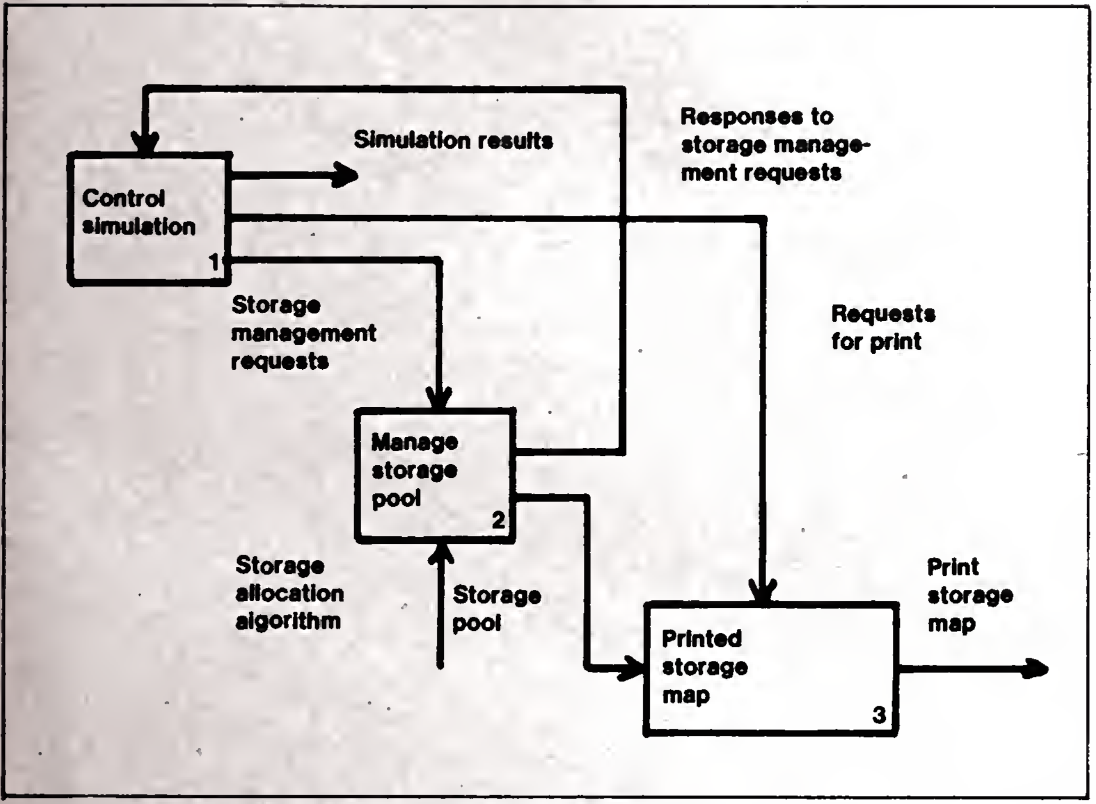

Figure 10. Example of a High-Level Activity Diagram

of view of task subdivision, it might be possible to define a module simply as a certain quantity of coding — for example, three pages. This would provide some kind of basis for subdividing the work on a programming project.

Not much thought is needed to see that the interfaces between the modules should be simplified and regularized as far as possible, both to minimize the communication needed between the programmers working on a project (simplifying the internal documentation and detailed management needed) and to make individual modules easier to understand.

Obviously, a good modularization scheme cannot be imposed on a coding effort once it is started — the scheme must be used from the outset in planning work assignments, in detailed software design and in managing the project. The modularization for a given project should be planned as soon as the design requirements are known and well before any coding starts. This indicates that a modularization scheme best belongs with the design stage of a large project.

Therefore, much of the existing work on planning the modularization of large software projects is connected with methodologies for regularizing the whole software design process in order to make implementation and maintenance of these projects more efficient.

Design Methodologies

Some of the design methodologies developed have achieved considerably more use than others in production programming environments. A principal factor in this differentiation is the amount and type of documentation available on each and the availability of courses of training in their use. The methodologies that are best supported, in this sense, are described below.

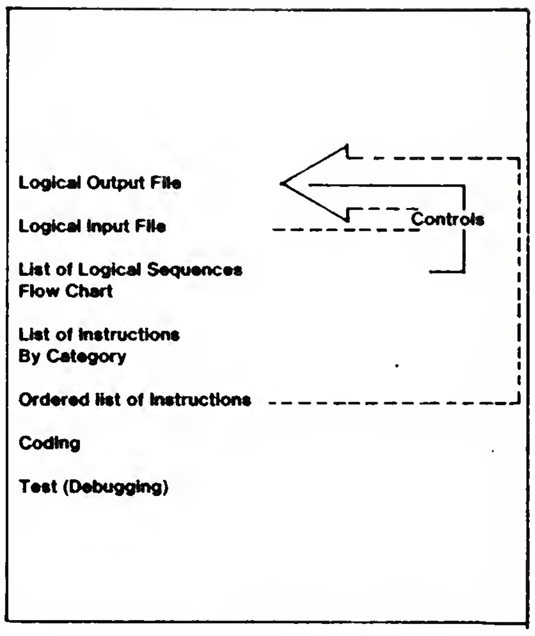
Logical Output File
Logical Input File
Controls
List of Logical Sequences Flow Chart
List of Instructions By Category
Ordered list of Instructions
Coding
Test (Debugging)

Figure 11. Creating a Program

Functional Decomposition: The Yourdon Approach

The functional decomposition approach to structured design involves a set of concepts that assist the designer in subdividing the software into modules that are relatively independent, so that each module is

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In short, we've created a VT100 family.

Affordable business graphics. The VT125 graphics terminal.

You might look at it as a VT100 with graphics. Or you might look at it as the first really affordable graphics terminal.

But what *truly* makes it unique, though, is a new graphics instruction set called ReGIS. (*Re*mote *G*raphics *I*nstruction *S*et.)

With simple but powerful commands, you can use ReGIS to turn numbers into instantly understandable pie diagrams, charts, bar graphs and curves with minimal demand on your CPU.

The VT125 also writes text as well as it draws pictures, so what graphics fail to say, words can.

The VT125 will work on any system that supports asynchronous ASCII terminals. As do all the terminals in the VT100 family.

This one, for instance:

A new economy terminal. VT101.

It has all the well known features of the VT100. But unlike the VT100, it was designed for people who don't foresee a time when they'll need the VT100 options or its space and power to expand.

The VT101 can display 80 or 132 column lines of data with smooth scroll. You can select double-height and double-width characters. And since its functions can all be personalized from the keyboard, you'll feel very comfortable working with it.

So if you need a terminal that's as good as a VT100 without the expandability of the VT100, this is it. On the other hand . . .

The VT102 might be all the terminal you'll ever need.

As standard equipment it has the most popular options available on the VT100. But like the VT101, it doesn't have the room and power for expansion.

You get an advanced video package which includes blinking characters, un-

VT132. Smart.
Block mode. Expandable.

VT131. Fully featured.
Smart. For block mode.

VT100. The standard.

on the idea that nothing works like a VT100.

derlining and a full 24 lines of 132 column characters. The package lets you maximize Digital's forms handling and editing software for increased productivity. It also has a printer port and five full and half duplex protocols so you can use a wide variety of modems.

The VT102 has a counterpart called the VT131. It's the block mode version for use on any asynchronous ASCII system.

Then there's the VT100 itself.

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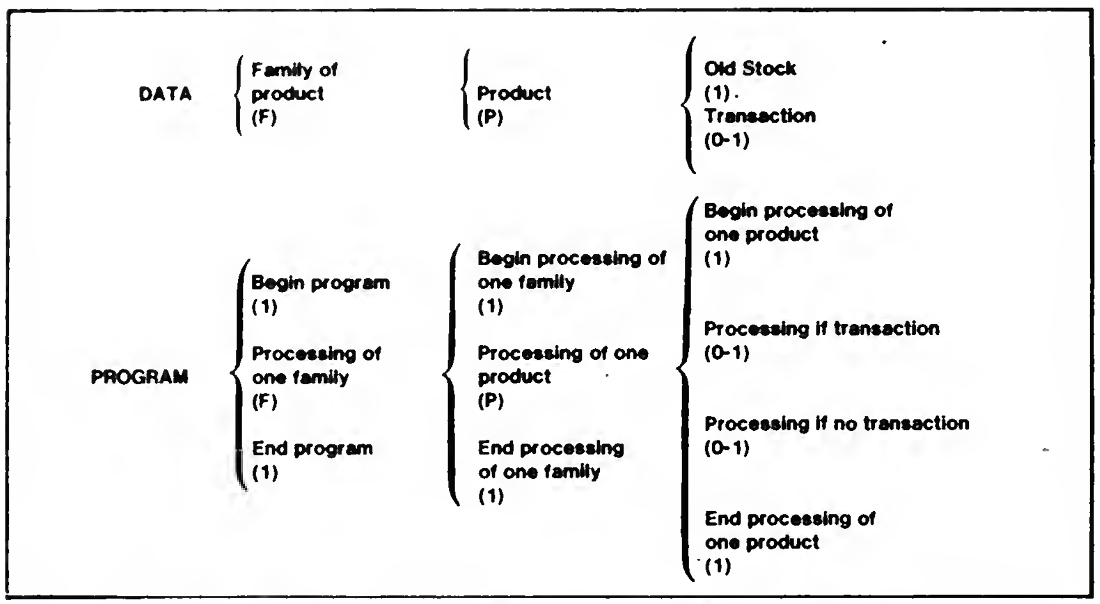

DATA
Family of product (F)
Product (P)
Old Stock (1)
Transaction (0-1)
PROGRAM
Begin program (1)
Processing of one family (F)
End program (1)
Begin processing of one family (1)
Processing of one product (P)
End processing of one family (1)
Begin processing of one product (1)
Processing if transaction (0-1)
Processing if no transaction (0-1)
End processing of one product (1)

Figure 12. Relationship: Data Hierarchy and Program Structure

small and manageable. It is a methodology that leads to a software system with a high degree of modularity.

This design method was developed principally by Constantine over a 10-year period. The first formal publication presenting Structured Design appeared in the *IBM Systems Journal*, Vol. 13, No. 1 (1974). Since then Myers (IBM), Yourdon and de Marco (Yourdon, Inc.) and Ganes and Sarsons (IPT) have all added to the basic ideas.

With the functional decomposition approach, a module is simply regarded as some named set of program statements, such as a subroutine or a macro. This general definition of "module" reflects one of the method's primary purposes: to fashion a framework for assessing and changing the quality of a design. With this approach, it is possible to say if a module (and, of course, a design) is good, fair or poor. Besides qualitative criteria, guidance is also given on how to produce a "good" design composed of "good" modules.

In evaluating a program module, two criteria are considered:

- Its connections to other modules (coupling).
- Its strength or intramodule unit (cohesion).

Yourdon gives categories of "goodness" under each of these headings.

Coupling, Cohesion

Coupling refers to the number of connections between a calling and a called module (or any other connected modules), as well as to the complexity of those connections. The minimum number of connections between a module and the calling module is one; otherwise, the module would not belong to the system.

Other connections pass some data one way or the other or both. The fewer the logical pieces of data that flow over the connections, the lower the coupling between modules. Most well-designed modules have only one way to be connected to a calling module with fewer than three or four logical pieces of data flowing through that connection. Clearly, in order to have a maximum independence of modules, coupling should be kept as low as possible.

The term cohesion is meant to describe how tightly bound together the instructions are within a module. If a module does more than one discrete task, the instructions in that module are not bound very closely to each other. Some instructions are mandatory for several tasks, and when changes must be made in one task, other tasks need to be considered. This arrangement is certainly more difficult and error-prone than if the module did only one task.

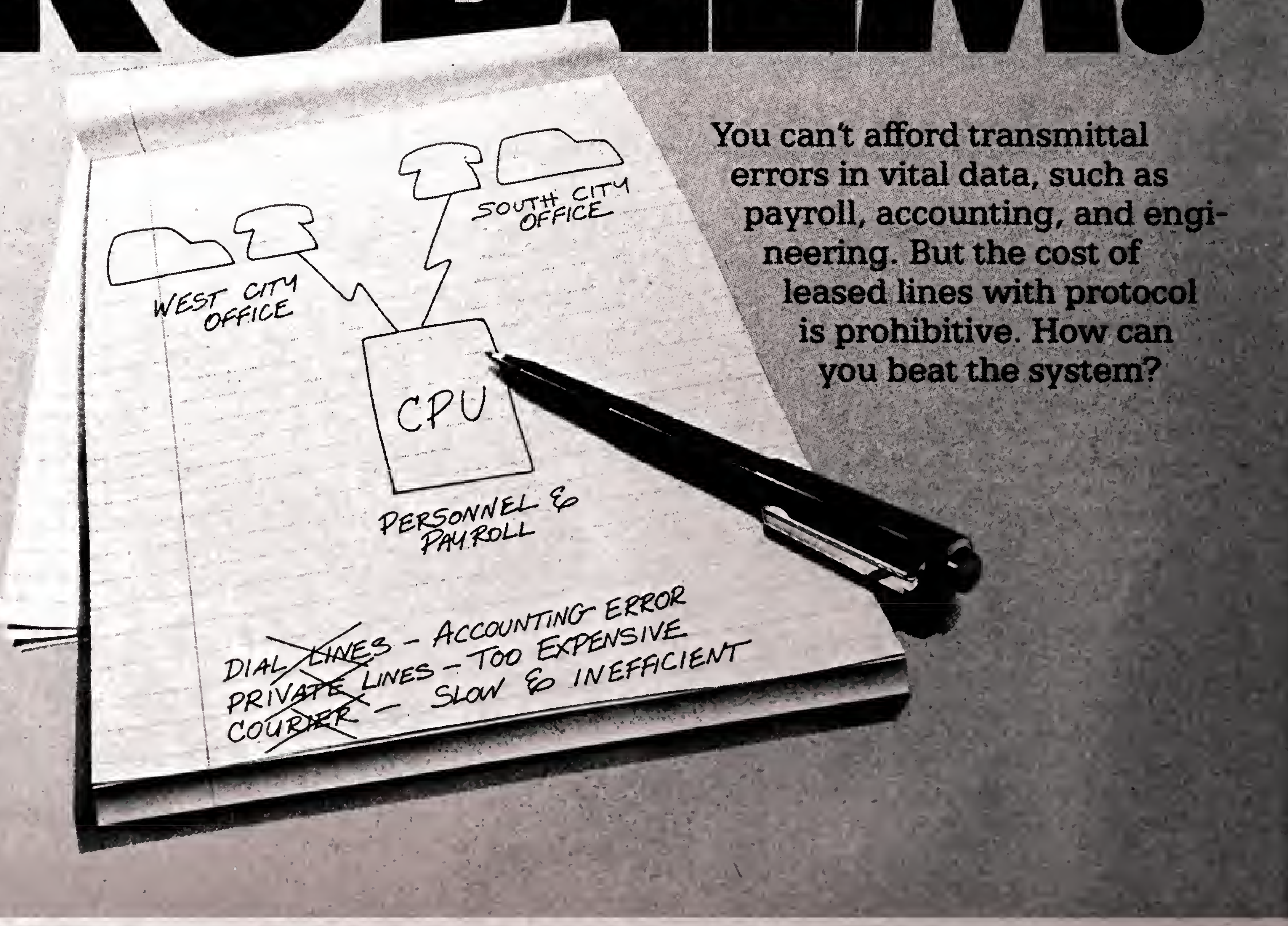
Modules that perform only one task are said to be more cohesive than modules that perform multiple tasks. "Strong" cohesion is better than "weak" cohesion.

The intent of structured design is to produce programs made up of modules that have low coupling between them and that are highly cohesive. Using these criteria, a given design can be assessed and reworked to improve its quality, to enhance its expected performance or to package it better for its target environment. Some design "quality" might be sacrificed as the result of such engineering trade-off analyses, but at least decisions have been made and their qualitative costs made more explicit.

Besides an evaluative framework,

PROBLEM:

You can't afford transmittal errors in vital data, such as payroll, accounting, and engineering. But the cost of leased lines with protocol is prohibitive. How can you beat the system?


SOUTH CITY OFFICE
WEST CITY OFFICE
CPU
PERSONNEL & PAYROLL
DIAL ~~LINES~~ - ACCOUNTING ERROR
PRIVATE LINES - TOO EXPENSIVE
COURIER - SLOW & INEFFICIENT

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Constantine's original work on structured design encompassed a particular design methodology. The intention was to produce a design of high quality, as measured by the coupling and the cohesion of its modules.

In general, the goal was for each module to be a procedure performing a single specific function. All communication between modules should be arguments that are individual data elements. This goal is not always attainable, but quality is always the initial design aim. Performance and packaging reworks are deliberately postponed.

Data Flow Diagrams

In designing a program or set of programs, a programmer needs to start with some statement of requirements. For purposes of this discussion, it is assumed that an adequate statement of requirements exists in written English.

Going directly from the requirements statement to a structured design is too difficult a conceptual task for most designs. Constantine developed the concept of data flow diagrams as a technique for expressing requirements in a graphical form and using that form to lead directly to a modular design.

The DFD is a representation of the data flows, with input data streams shown at the left side of the diagram and output data streams appearing on the right side of the diagram. The focus is only on the major streams of data as they flow (and are transformed) from external input to external output (see Figure 5, In Depth/30). Each bubble can be thought of as a small computer that reads a sequential input stream, performs some transformation (calculation) on the data and outputs the transformed data.

The purpose of the DFD is to clarify the requirements and to identify major transformations that will become programs or modules. During this stage, detailed control flow only clouds the concept of structured design.

The DFD forms the starting point of the design process that "functionally decomposes" the requirement specification in a top-down fashion until the lowest level of detail is reached.

Structure Charts

Because most computer-oriented people have been trained in flowcharting, it is very important to note

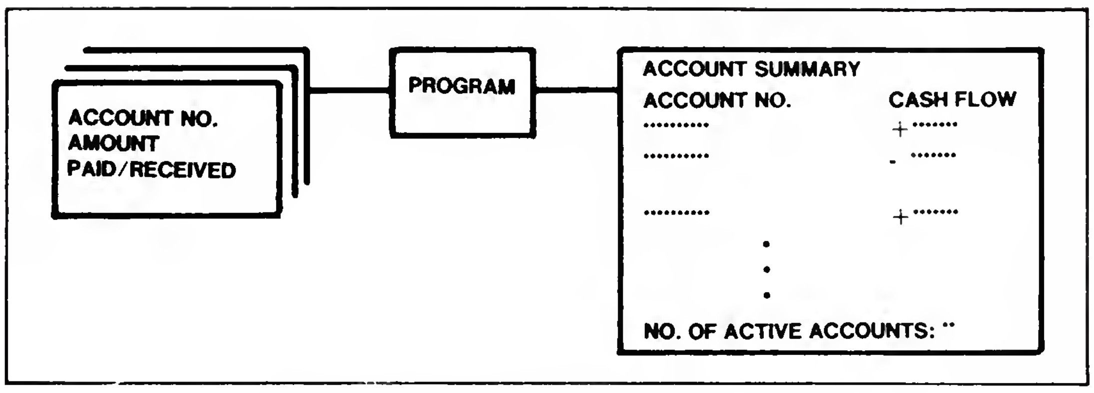


Figure 13. Accounts Report Program

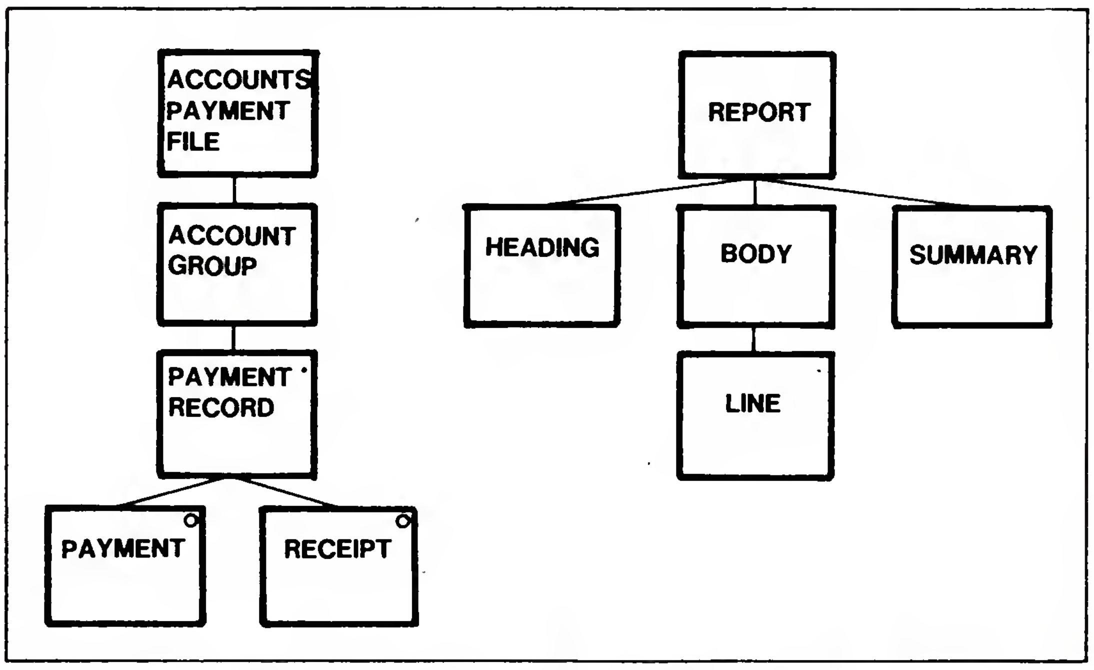
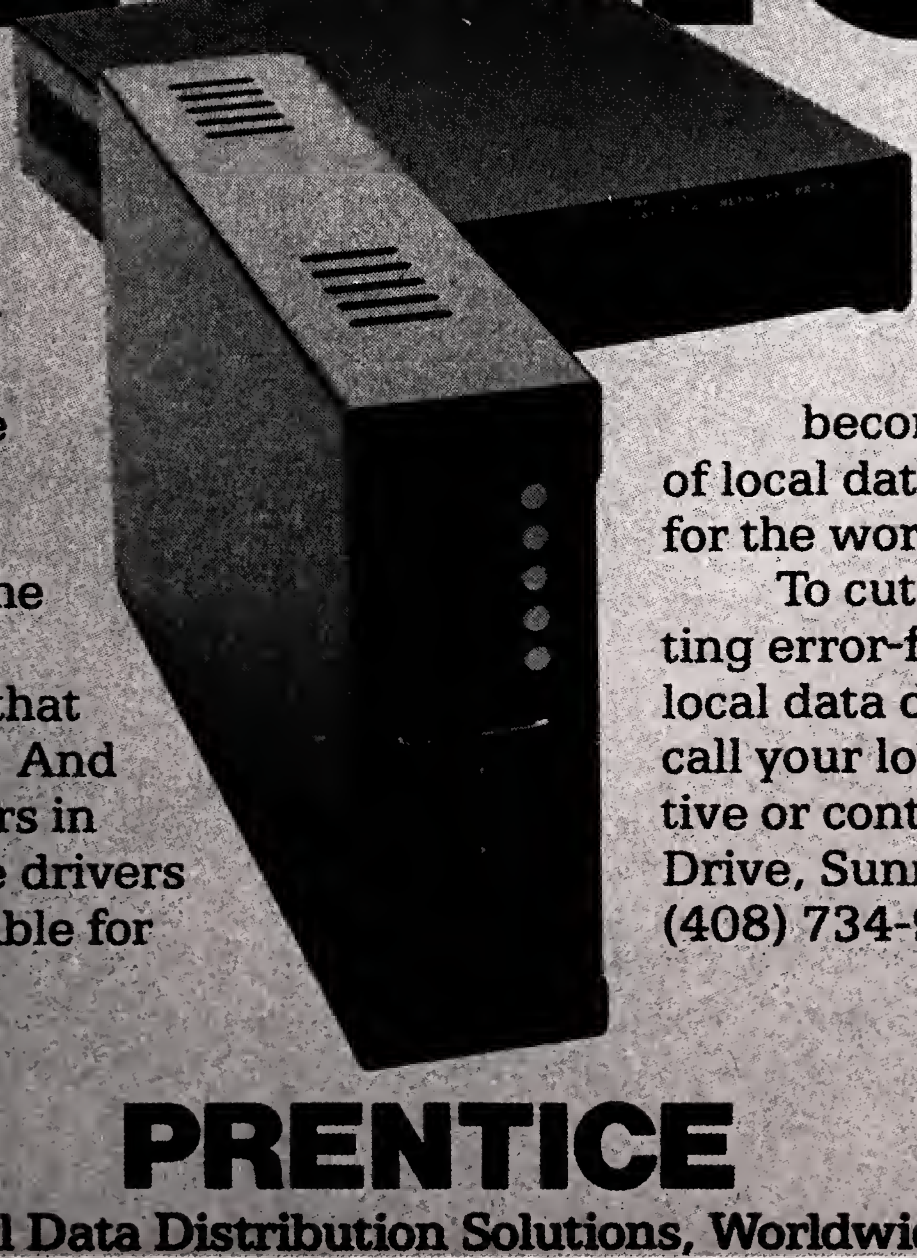


Figure 14. Input and Output Data Structures



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that a structure chart is not a flowchart and is not related to a flowchart (see Figure 6, In Depth/30).

Each box on the structure chart represents a set of instructions. These instructions can do anything. However, the only modules that are called are those shown by the boxes located below another module and connected to it by lines that represent calls.

For convenience, modules that generally are called first are located to the left of those that are called later. This arrangement is not true all the time because the calling module may vary the order in which it calls the submodules, depending on the data. In this case, additional notation to represent selections on iterations are used, superimposed onto the structure chart.

The structure chart technique is a powerful and easy method by which to display the modular structure of a program.

Structured design is concerned with techniques and procedures for assisting a designer to produce a proposed design and to portray that design in a structure chart so that other people may appraise and approve the design. In the Yourdon method, the starting point for the analysis of the problem is data flow, rather than data structure, which is used in the Jackson Design Methodology.

The Yourdon methodology has now evolved to the point where it can be used over a large part of the system Development Life Cycle (see summary of Yourdon method on In Depth/32).

Functional Decomposition: Sadt

Structured Analysis and Design Technique is a proprietary product of Softech. Sadt is a simple but powerful diagramming technique to aid the functional analysis and decomposition of problems. It provides clear records of the thought processes of the analyst/designer and a clear means of communicating and sharing work between members of a project team rather than procedural rules for the design of a system.

The basic diagramming unit is shown in Figure 8 on In Depth/34. The box contains the name of either an activity or a data item. In the former case, the input and output arrows represent data items; in the latter case, these arrows represent activites. This same basic diagramming unit is used at all levels of analysis and design.

The initial step is to produce a high-level activity diagram that, in a very general way, completely describes the system to be designed. An example is shown in Figure 10 on In Depth/35. Each of the activities in the highest level description is then decomposed into further levels of increasing detail without extending or limiting the activity described in the original activity box in any way. This process is shown in Figure 9 on In Depth/34. Box A3 represents exactly the same activity as Box AO.3 at the higher level, but describes the activity in greater detail.

At each level of decomposition, the activity diagrams are distributed for comment among members of the analysis/design team and further decomposition starts only when agreement on the current level of decomposition has been achieved.

When there is confidence that the higher levels of activity diagrams are stable, data diagramming can begin. The idea is not to create simply a transformation of the activity diagrams, but to take a separate, data-driven view of the system in an at-

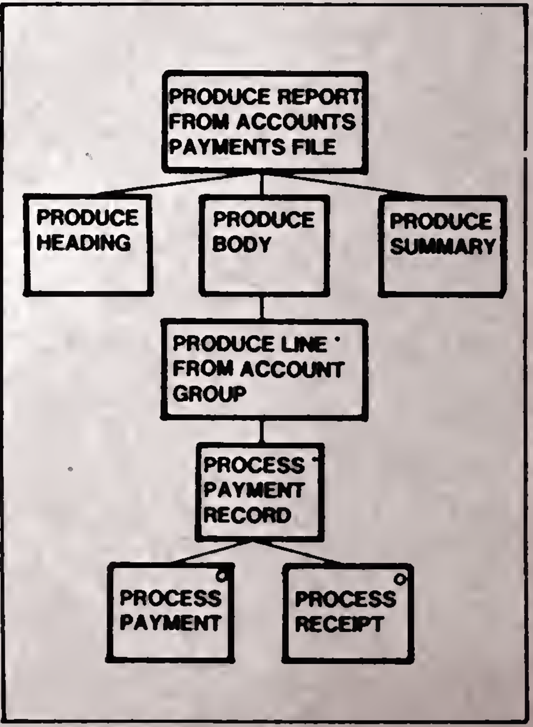

Figure 15. Program Structure

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```
1 STOP                        9 CASH-FLOW: = CASH-FLOW + QTY
2 OPEN PAYMENTS FILE         10 CASH-FLOW: = CASH-FLOW - QTY
3 CLOSE PAYMENTS FILE        11 ACTIVE-ACCOUNTS: = ACTIVE-ACCOUNTS + 1
4 OPEN REPORT                12 ACCOUNT ID: = NEXT-ACCOUNT-ID
5 CLOSE REPORT               13 READ PAYMENTS FILE (PF)
6 PRINT REPORT HEADING       14 CASH-FLOW: = 0
7 PRINT CASH-FLOW LINE       15 ACTIVE-ACCOUNTS: = 0
8 PRINT SUMMARY LINE
```

Figure 16. List Program Operations

tempt to provide new insight. The activity and data models of the system can then be checked against each other for consistency and completeness.

At this point, the activity model is scanned to establish what sort of mechanisms (such as parsers, sorts, data validators and queue handlers) would have to exist in the underlying implementation if the functional model were to be implemented directly from the diagrams. These are then added to the activity diagrams using the "mechanism" arrow. The mechanisms associated with the high-level activity diagrams will be very general.

The procedures described up to this point complete the high-level design. Decomposition at the more detailed levels proceeds using the assumed mechanisms until a stage is reached in which all the activities and mechanisms have implementations that are well known or for which code can be readily inferred. At this point, the system could be coded using data specifications derived from the data diagramming. Lower-level design and implementation can be carried out in parallel by individual members of a team, each using a given activity diagram, with confidence that the resulting "modules" can be integrated easily.

Sadt: Conclusion

From the above, it can be concluded that Sadt provides a disciplined approach to clarifying and recording the design of a system. It provides a particularly powerful diagramming technique and a great deal of help in establishing confidence in the consistency and completeness of a design, based on a primarily functional approach.

However, it does not in itself provide criteria for design and decomposition or provide procedural guidelines. Moreover, assessment of the quality of the design must be intuitive. A criticism of Sadt is that with four types of "connector" to each module, the diagrams become rapidly more complex than is true with other diagramming methods.

Design Based on Data Structure: The Warnier Approach

Warnier's approach to design is embodied in three separate but linked techniques known as Logical Construction of Systems (LCS), Logical Construction of Programs (LCP) and LCE. The first of these, LCS, and the second, LCP, provide a means of systematically organizing the data within an organization and the processing of it. LCE, which will not be further discussed, provides a method of scheduling the execution of the resultant programs and is involved more with implementation and not design.

Logical Construction of Systems

In order to identify and place a structure on the data used with a system, a model of the system, showing data used in transactions between suppliers and customers, is used as a framework. The supplier in a transaction may be within or outside the organization (internal or external) and the same applies to the customer.

The total data base for the system is identified by examining the output of all the transactions that occur.

The next step is to construct a number of logical base files in which the data is logically contained. A logical base file is the set of output data (and any input data on which it is dependent) used in transactions in which a given supplier or consumer is con-

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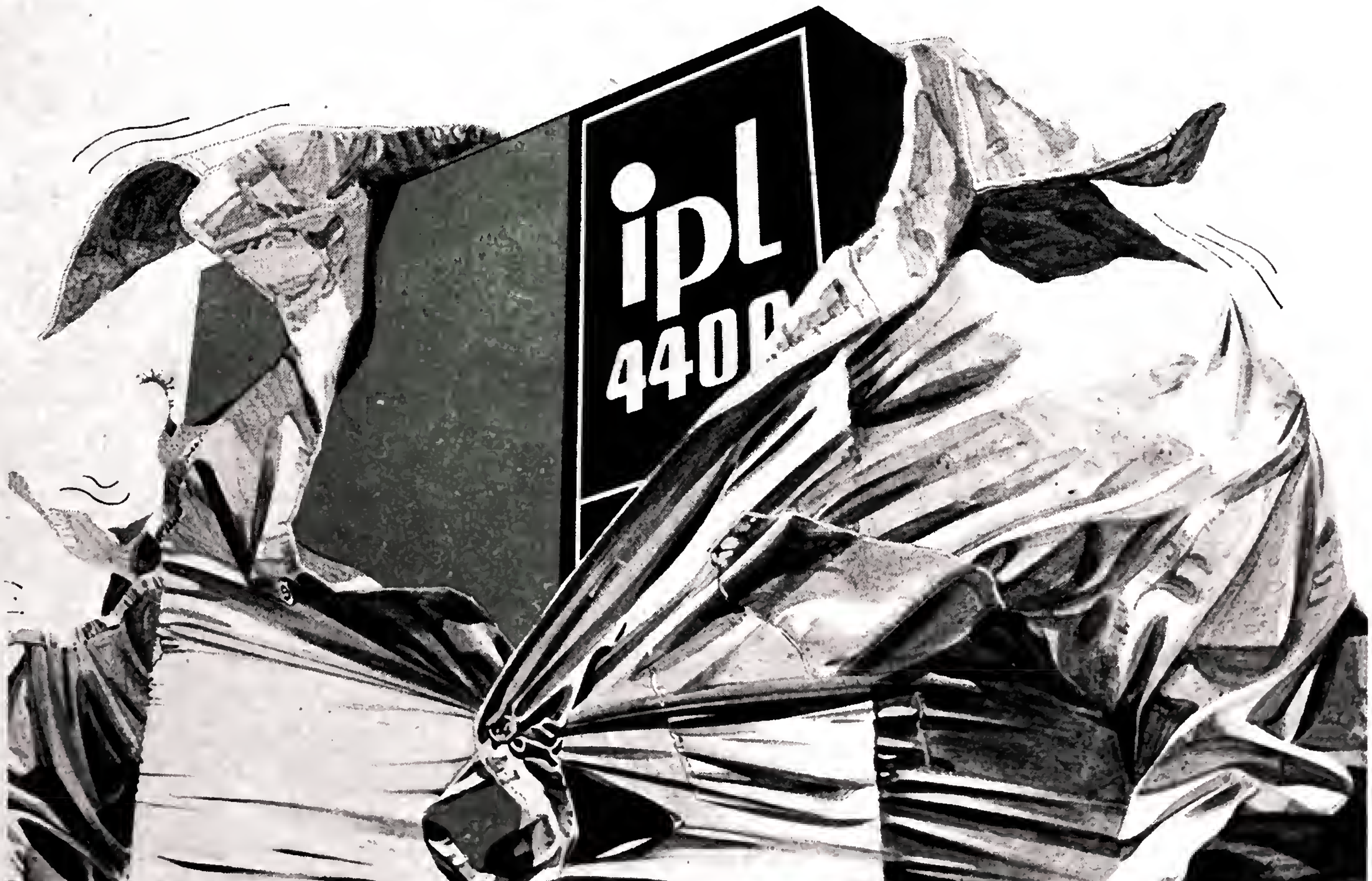


cerned. The data in the logical base files is then mapped into physical files, eliminating or permitting data redundancy according to whatever criteria apply to the implementation of the particular system.

The distinction between the logical and physical files is that the logical files reflect a hierarchical view of the data within an organization, whereas the physical files reflect implementation considerations to do with the computer system. Changes in equipment, therefore, do not affect the validity of the logical files.

Given the organization of logical and physical files, it is possible to proceed to programming.

Logical Construction of Programs

The decomposition of a system into programs is intuitive. However, given the logical output that is to be produced by a program, LCP provides procedural guidelines for the construction of the program.

The starting point in the construction of a program is consideration of the logical output file or files. From this, the necessary logical input file or files can be derived and the location of the logical input data on physical files can be ascertained. These and the succeeding steps in the construction are illustrated in Figure 11 on In Depth/35.

The program control constructs are constrained to the standard iteration, selection and sequence constructs of structure coding. Essentially, the programming procedure consists of listing, for each item of data in the logical input hierarchy in turn, the operations needed on the data to produce the required output. This list of operations is then used for coding. The relationship of data hierarchy to program structure is shown in Figure 12 on In Depth/38.

Warnier's methodology provides a useful procedural framework for decomposing programs which work best when there is a close correspondence between the logical structure of the input and output. It also provides a helpful framework for organizing files. If there is no close correspondence between the logical structures of input and output data, then the Warnier technique either forces a new structure for the input or becomes unworkable.

In the first case, the "new" input data structure will need to be derived from the old, original input data structure by means of a separate program or routine. In the second case, the program must be respecified on a different design technique chosen.

The Warnier technique is marketed in the U.S. by Ken Orr and Associates of Topeka, Kan.

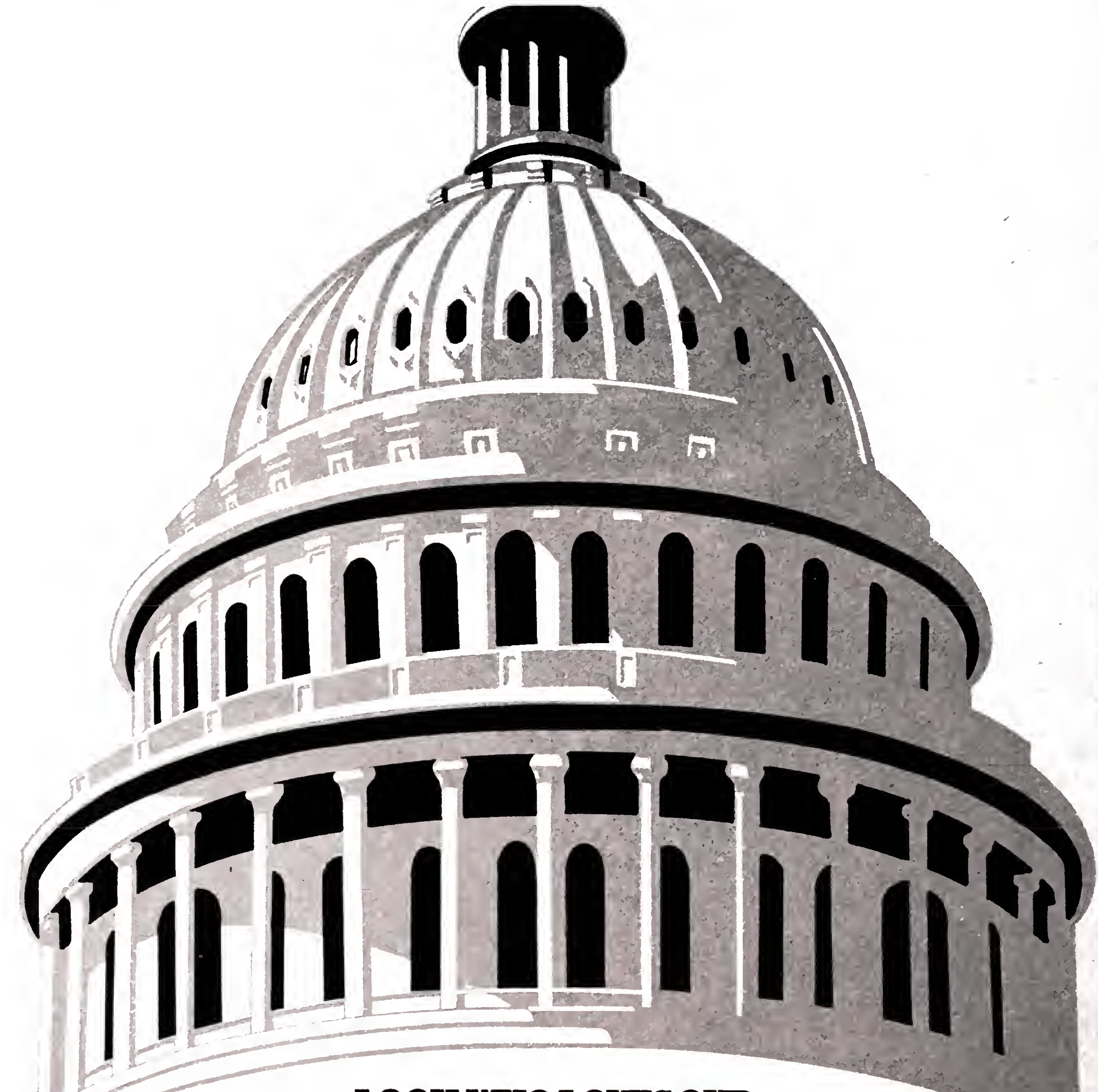
Design Based on Data Structure: The Jackson Approach

The Jackson Design Methodology (JDM) is based on the principle that, at the specification stage of a program, the element that exhibits most structure is that of the data needed. Therefore, the program structure should be based on the data structure because this most closely reflects the "natural" form of the application problem.

Rather than defining a series of program functions (as in a conventional flowchart), the Jackson approach is to define the structure of the data and then to derive the program structure from the data structure(s).

The program functions needed to process the data are then allocated to the corresponding components of the program structure. Because the data structure is adopted as the basis for the program, many benefits are claimed in terms of better understanding of the requirements and greater ease of maintenance.

The JDM was developed from earlier work on modular programming by Jackson, a UK consultant. The methodology was published in 1975 in his *Principles of Program Design*. This method, through widespread teaching and refining, has developed into a comprehensive set of techniques that cover the whole program design process and show how to deal with every sort of program design problem. The degree of procedurality of the method has also been an attraction to large organizations because of its effect on standardization and on visibility and the ability to move staff rapidly from one project



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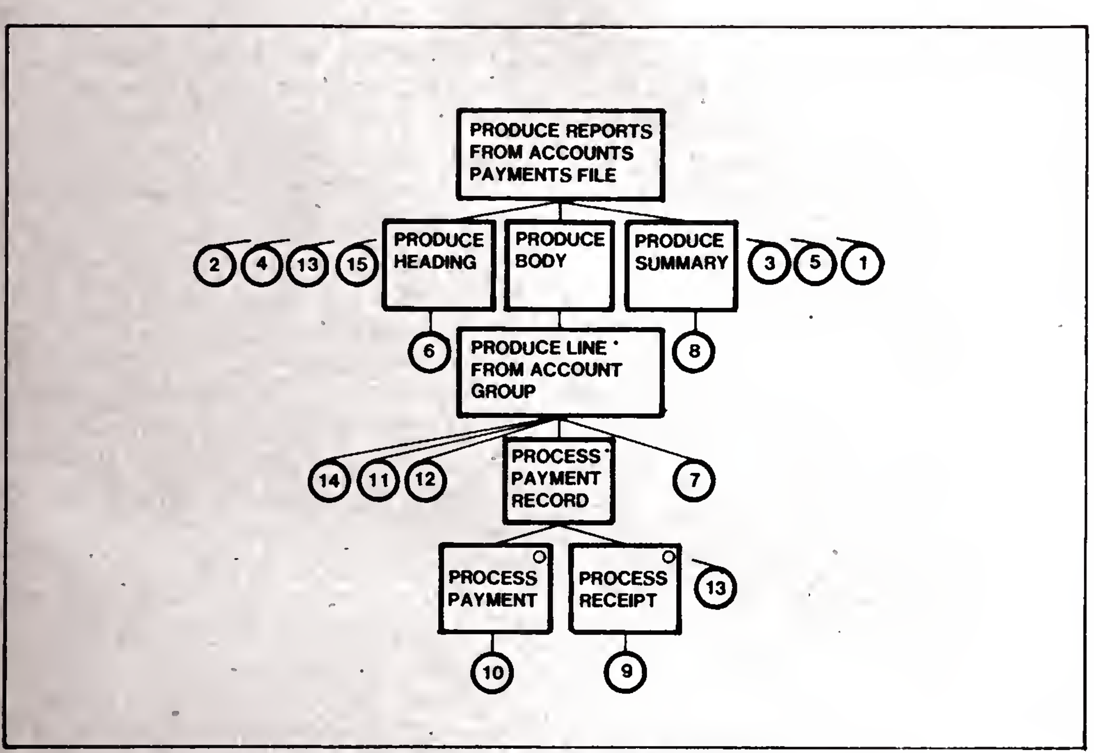

Figure 17. Allocate Operations to Program Structure

to another.

The basis of the method is a series of design steps:

1. Define the (input and output) logical data structures and draw them in the form of a hierarchy of entity boxes using only the three constructs: sequence, selection and iteration (indicated by special notation).
2. Find where there are corresponding processable elements in these structures.
3. Form a program structure by merging the data structures at the points of correspondence.
4. List the program's executable operations and allocate them to the program structure.
5. Convert the program structure to a sequential set of program statements in pseudocode form (known by Jackson as "schematic logic").
6. Write the program code by converting the pseudocode into the specific programming language in use.

The whole operation can best be illustrated by a simple example.

Example Program

An accounts payment file contains information about money received and paid. The records are in account number order and each record comprises the account number, a paid/received indicator (P for paid, R for received) and the amount of money. There may be more than one record for each account number.

The requirement is to produce a report showing net cash flow for each account and, at the end of the report, a summary line showing how many accounts have been active.

The first step in the JDM is to draw the data structures of the input and output. In the example they are shown in Figure 14, In Depth/39.

Each box represents a processable entity of data and each diagram as a whole represents the structure of the data (not the flow of data). The structure is comprised only of elements representing the three basic constructs of structured programming: sequence, iteration and selection.

Sequence is represented as a left-to-right sequence of boxes with no symbol.

Iteration is represented by an asterisk in the top right-hand corner of the box.

Selection is represented by a circle in the top right-hand corner of the boxes.

These constructs cannot be mixed; an iteration, for example, cannot also be part of a sequence.

The interpretation of the diagrams given is therefore as follows:

Input: The accounts payment file comprises a number (iteration) of account groups, each of which contains a number (iteration) of payment records. Each payment record is either paid or received (only one alternative can be selected).

Output: The output report comprises a heading, the main body of the report and a summary line at the footing in that sequence. The body of the report comprises an iteration of lines.

The program structure is created by examining the input and output data structures to identify which data entities can be processed together. This process is called looking for *correspondence*. In the example, the accounts payment file and output report correspond because one file produces one report. Similarly, the data entity LINE in the output corresponds to the data entity ACCOUNT GROUP in the input, one line being produced for each account group.

Using these two correspondences as points at which to combine the input and output data structures, a program structure is then formed as in Figure 15 on In Depth/40.

The next step is to list all the program operations needed to complete the processing of the application. This list is created by considering what operations are required for:

1. Stopping the program.
2. Opening and closing files.
3. Outputting the results.
4. Calculating output.
5. Reading input.
6. Managing internal variables.

No account is taken at this stage of the operational sequence of these — they are merely listed as above and numbered for reference purposes, as in Figure 16 on In Depth/41.

Having established all the operations needed to process the data entities, the next step is to allocate these to the appropriate parts of the program structure in the form of additional sequence elements. The result of this is shown in Figure 17.

To achieve this allocation, the following procedure is carried out. Each operation is considered in turn and the question asked, "Where does this operation fit in the program structure?"

In this case, opening the input and output files are the first operations to be carried out, so they appear first in the top sequence. The other operations are added to the appropriate places in the program structure. For example, the operation that carries out the cash flow calculation for payments (10) is clearly associated with the PROCESS PAYMENT program component and is therefore allocated there.

Note that the allocation of Operations 14, 11, 12 and 7 produces at a single level a mixture of sequence components (the operations) and an iteration component PROCESS PAYMENT RECORD. In practice, an additional sequence component would have to be inserted above the PROCESS PAYMENT RECORD to avoid the mixture of sequence and iteration constructs. Similarly, at the lowest level, Operation 13 produces a mixture of selection and sequence components.

The final step in the method is to list the operations in the sequence implied by their positions on the program structure chart. This "schematic logic" is shown in Figure 18 (the operation numbers are shown on the left merely for convenience of identification). At this stage, the conditions for the iterations and selections are also added and the "code" indented as implied by the hierarchical structure of the program.

Clearly, the example shown is not at all complicated and ignores many of the features likely to be met in real life — error conditions, end-of-page and so on. In tackling larger application programs, however, exactly the same steps apply. Extra techniques may need to be called in to deal with more complex situations within each step, but the specific cases where such extra techniques are needed are fully recognized. Rules and guidelines are given for how the techniques are to be used.

For example, if insufficient processing correspondence can be found between the input and output data structures, a "structure clash" is said to exist. This must be resolved before a program structure can be created. The resolution of structure clashes generally results in the creation of additional programs that are designed separately and then recombined using linkage techniques. The methodology also provides a completely procedural way of dealing with the types of programming problem that frequently cause difficulties in creating reliable program solutions.

The essence of JDM is that an input is "consumed" or processed as soon as possible. In general, this is an efficient method of operation. It lends itself readily to the design of real-time and transaction processing systems. In such cases, it is only the implementation details that change between batch and real-time systems.

```
PRPF SEQUENCE

 2     OPEN PAYMENTS FILE
 4     OPEN REPORT
13     READ PAYMENTS FILE (PF)
15     ACTIVE-ACCOUNTS: = 0
 6     PRINT REPORT HEADING
       PBDY ITER UNTIL EOF-PF
14       CASH-FLOW: = 0
11       ACTIVE-ACCOUNTS: = ACTIVE-ACCOUNTS + 1
12       ACCOUNT-ID: = NEXT ACCOUNT-ID
         PACCTGP ITER UNTIL NOT (ACCOUNT-ID:
                = NEXT ACCOUNT-ID) OR EOF-PF
            REC-BDY SELECT PAYMENT
10            CASH-FLOW: = CASH-FLOW - QTY
            REC-BDY OR RECEIPT
 9            CASH-FLOW: = CASH-FLOW + QTY
            REC-BDY END
13          READ PAYMENTS FILE (PF)
         PACCTGP END
 7       PRINT CASH-FLOW LINE
       PBDY END
 8     PRINT REPORT SUMMARY LINE
 3     CLOSE PAYMENT FILE
 5     CLOSE REPORT
 1     STOP
PRPF END
```

Figure 18. List Schematic Logic

As can be seen from the steps of JDM, the detailed considerations of machine and language are left to a late stage — after schematic logic is produced. This machine independence can be of value in designing common systems to be implemented on several different hardware/software configurations provided the original program structure is maintained consistently.

The process of producing code from the schematic logic is a purely "mechanical" one and preprocessor software is available to do this automatically. Similarly, other aspects of the methodology — such as documenting the data structure diagrams — appear to lend themselves to computer-assisted design aids.

In its original form, JDM is only concerned with *program* design and the assumption is made that the overall definition of requirements for a program has already been made. The basic approach of the method, however, is also applicable to systems design. Users of the methodology have used it as a basis for designing systems. The procedures use essentially the same philosophy of defining data structures and eliminating "clashing" structures.

This has proved particularly beneficial for program design in eliminating the types of errors caused by lack of complete understanding in complex situations. The same advantages also apply in system design, where the common problems of functions being shared between different programs are clarified by being completely proceduralized.

The specific benefits of using JDM are:

- The data structures form a definite and consistent basis for the program structure.
- Because program operations actually operate on data and the program structure is based on data structures, allocating the operations to the correct places in the program is trivially easy.
- The program structure is a "model" of the requirements specification in that it mirrors the required data transformations. This renders maintenance of the program much easier than with more traditionally designed programs.
- The procedural step-by-step nature of JDM ensures that the methodology is teachable, repeatable and, in some circumstances, automatable.
- The same hierarchical structure diagram notation is used to represent the requirements (data structures) and the final program. This consistent use of a single notation greatly enhances communication between different involved groups of users, analysts, designers and programmers.

JDM is one of the more highly developed procedural methods for producing programs and has produced great insight into the program development process among those who are using it to its fullest extent. As with the Warnier technique, it represents a fundamental change in the method of thinking of most programmers. For this reason, it takes some time to be fully exploited.

A major apparent disadvantage of JDM is that it produces complete, diagram-oriented documentation. This documentation needs to be updated whenever the system or program is updated. This is, of course, true of any "fully" documented system. When organizations move from "zero documentation" to "full documentation," more effort is required to remain current. It should be obvious however, that the benefits do pay off.

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Management Concerns in the '80s

By Michael Marcus

As the decade begins to unfold, data processing managers are facing unprecedented new opportunities and challenges. The author pinpoints five areas that he considers the hallmark concerns for DP management in the '80s.

What will be the concerns, opportunities and working environment for data processing management throughout the '80s? Several topics are worth considering:

- The nature of careers in system development and project management.
- Development costs vs. maintenance costs.
- The effects of microcomputers.
- Audits and evaluations.
- The data processing career path to the top.

Let's explore each of these in detail.

Careers in System Development

Historically, programmers have become senior programmers, then systems analysts. Then, without benefit of any special preparation, training or formally demonstrated capabilities, they have gone on to become system development project managers, managers of data processing for their employers or data processing consultants.

However, in the past few years, it has been recognized that project management is an identifiable profession — or job category, if you like — requiring specific skills, training, knowledge and even cultivated personality traits.

Moreover, the potential impact of data processing and communication systems on society is so profound and pervasive that some statutory protection from systems, and the people who are capable of exploiting them for their improper benefit, may be required.

The concerns of data processing project management are not very different from those of a few other industries, such as construction and aerospace, which have long recognized the need for, and routinely employed, professional project managers. Because no two projects or systems are quite the same, these industries recognize the requirement for expensive, often hard-to-find people with specialized skills.

Moreover, rapidly changing technology demands multidisciplined work forces, significant task dependencies and tight schedules.

In our field, successful project managers require, in addition to their general technical background, knowledge of the following:

- Tools and aids for project planning and control and for effective resource allocation; for example, Pert and Atlantic Software, Inc.'s System Development Methodology, Project Control/70 and Estimator.
- System development aids such as librarians, debugging monitors

and high-level language processors.

- Basic finance and accounting principles as they apply to system development. In order to work within budget, the project manager must be able to make intelligent trade-off decisions concerning hardware vs. software costs, use of outside software services vs. in-house staff, purchase of software packages or turnkey systems vs. custom development.
- Personnel management concepts: how to interview, hire, terminate, motivate and compensate people. In addition, it has become increasingly important to be familiar with personnel-related government regulations such as Equal Employment Opportunity and industrial relations agreements.
- Special industry or application-oriented rules as they apply to the system(s) being developed. For example, these include privacy laws as they apply to banking and Securities and Exchange Commission regulations as they apply to the securities brokerage industry.
- How to recognize the project in trouble: criteria for scrapping vs. recovering it and how to get it back on track, should recovery be decided on.
- The overall policies and guidelines of the organization for which the project manager works.

Despite some company-conducted training in most of these areas and the existence of seminars on project management, learning about these subjects has been, for most project managers, a matter of on-the-job training.

Distinct Profession

The increasing complexity of systems, costs associated with their development and the risk organizations face should systems fail to be completed on time and function properly has resulted in a growing trend to regard project management as a distinct profession.

We can expect system development project managers to be chosen with greater selectivity and given considerable formal and on-the-job training. They will be in great demand and will, consequently, be quite well paid.

If we take a look at those fields in which licensing or certification is granted for qualified practitioners, we see that they can be categorized in one or more of the following ways:

- Their services are required by a large segment of society and are complex and/or technically advanced (for example, accounting, law and medicine).
- Their practitioners, although not directly in contact with a large segment of society, provide services that have vast potential impact on it (architects, professional engineers).
- The growth of the field imposes an increasing need for standardization (for example, standard accounting rules).

Protections for Society

When these conditions exist, society perceives a need to protect itself from malfeasance and misfeasance, particularly as the number of practitioners in such fields grows, and it resorts to certification or licensing, usually at the state level.

Mandatory certification of DP professionals has been discussed for several years with little public pressure for it and consequently little movement toward its implementation. The situation is changing, however, as the number of individuals affected by systems increases and the conditions enumerated above become more clearly applicable.

As in other endeavors, not all practitioners need be licensed; one responsible licensed individual can certify that a particular system developed under his aegis meets predefined standards or guidelines. Architects and licensed professional engineers perform this function for buildings and other structures. In some cases, the professional DP project manager will be licensed; in others, he will not be, but a licensed DP professional will put his stamp of approval on the system.

It may well be that the thrust toward professionalism, as described above for project managers and licensed DP practitioners, has a counterpart in the other direction. With the large number of people required to program applications, a job catego-

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ry of coders may develop for people with limited systems knowledge. At this point, an analogy can be drawn with the accounting field, comparing coders to bookkeepers (since both work within the rules and limits set up by others), system analysts to accountants (who set up those rules and limits) and licensed DP professionals to certified public accountants (who oversee them all).

'It takes a particularly competent, self-motivated person to get into someone else's code and correct it or add enhancements. This is particularly true with on-line and real-time systems . . . We can expect to see the image of maintenance programmers rise significantly in management's eyes and, as in the case of project management, emerge as a specialization.'

Advances in technology have resulted in less expensive hardware — lower price/performance ratios and lower data storage costs — and in making hardware more readily available because of relaxed environmental operating requirements. At the same time, people-related costs have gone up dramatically.

Personnel costs are increasingly tied to system maintenance, as opposed to system development. There is, in a sense, a new economics with which DP management has to contend.

So far, management's response to falling hardware costs vs. rising software costs has been to buy more and faster hardware to increase programmer productivity, or at least to reduce programmer time. Programming time is reduced in two ways. First, programmers have more access to computers for development activities — source editing compilations and testing. Second, less efficient code — whether generated from high-level languages or as a result of using "brute force" designs — will nonetheless get the development job done faster.

A similar trade-off in system development costs vs. maintenance costs can be made, I believe, in most cases. Systems can be designed so that increased development costs can result in less expensive maintenance. This has been known for a long time, but if one looks at system design criteria (including functionality, throughput, capacity, reliability, development costs and run time) ease of maintenance is often a low-priority item, if it is considered at all.

Even where designers have considered maintainability and given it its due, programmers often neglect to follow through and managers tend to sacrifice it in favor of shortening schedules. When system designers make trade-off decisions related to design criteria, clearly maintainability cannot take precedence over reliability, for example, but it often can take precedence over throughput, development costs and run-time requirements.

What is maintainability after all? It has to do with designing, documenting and coding a system so that fixes, changes and enhancements can be implemented relatively quickly and by persons who were not part of the original development team. Structured design, enforced documentation standards, structured coding, incorporation of debugging aids — all of which contribute to good system development practices and have always been desirable — are now mandatory and must be enforced more rigorously. The concept of maintainability of software is akin to the concept of serviceability of any hardware product where the product's design has taken into account such considerations as test points, ease of access to the various components and so forth.

In many shops, maintenance work has been traditionally allocated to relatively junior programmers — or to the few senior ones willing to forego the lure of developing new systems. When one looks at it, however, one finds that it takes a particularly competent, self-motivated person to get into someone else's code and correct it or add enhancements. This is particularly true of on-line and real-time systems, which are complex and for which timing considerations complicate things further.

We can expect, I think, to see the image of maintenance programmers rise significantly in management's eyes and, as in the case of project management, emerge as a specialization.

Traditionally, if an organization lacked sufficient programming resources to both maintain existing systems and develop new ones, and a decision was made to contract work to an outside software firm, it was the development work that was farmed out. This may well change, with software firms contracting to maintain systems developed by others.

Reducing ongoing maintenance costs at the expense of increased one-time development costs and contracting out maintenance — with the result that maintenance costs become visible budget items — will be, for most of us, a radical departure from our current mode of doing business. It will require that top management be educated to go along with what amounts to an investment today for benefits tomorrow in an area about which often little is known. But then, a very similar situation existed in the computer field 20 years ago.

The widespread availability of microcomputers is resulting in a growing trend by non-DP personnel to introduce microcomputers into their departments to provide facilities and capabilities not afforded them by the DP department and to augment facilities and capabilities afforded by the DP department. In some cases, application programs are purchased from the microcomputer vendor or a third party; in other cases, the application programs are developed by the user or by people the user retains. In either case, the DP manager generally has little say or control over:

- Which microcomputer is purchased.
- Which peripheral hardware is purchased.
- The terms of the purchase.
- What software packages are selected for purchase.
- What software is developed.
- The quality, documentation standards and other criteria for software purchased or developed.

This can be of major concern to the DP manager if:

- The application becomes a vital part of the business as opposed to merely an aid to a particular group.
- The application requires data from, or generates data needed by, the firm's DP facility and some type of interface between the systems becomes necessary.
- The user gets into trouble with the microcomputer system and top management requests or expects the DP department to bail him out.
- A proliferation of microcomputers throughout the organization undermines the DP department, draining away influence, budget and other resources.

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The DP manager has a few options. He can ignore the situation, fight in-

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troduction of microcomputer systems by users or encourage introduction of microcomputer systems in an environment controlled or at least guided by him.

The first two options will only result in others encroaching on his turf and in giving him problems.

The third option can result in his attaining greater visibility in the organization and greater control over all DP and computer-related activities. It will also strengthen the organization overall by fostering compatibility between computers used for different applications.

The question is this: How does the manager go about exercising this third option? He can let it be known throughout the organization that his department is aware of the potential and economy of microcomputer systems and is ready to assist end users. The DP department can assist users by:

- Offering short seminars on microcomputer systems.
- Providing in-house consulting to assist users in purchasing and/or developing application software.
- Serving as the central purchasing agent for everyone in the organization to obtain volume discounts, favorable service and support arrangements, standardization of hardware so users can back one another up and so forth.
- Promulgating software standards for documentation, coding and system interfaces to promote software compatibility and increase maintainability.

Audits and Evaluations

I described earlier how society might, in the future, exert a certain amount of control over the DP profession in the form of licensing or certification of practitioners. Today, however, we are witnessing the effects of another form of influence, this time exercised within the corporate world, that was not deemed necessary a few years ago — namely, outside audits or evaluations of systems, DP departments and DP companies.

Such audits and evaluations will become commonplace and even routine or periodic, partly because there is a growing concern in the business community regarding the privacy and security of information, as well as combatting computer fraud.

Moreover, DP systems have become an important element of corporate assets, systems operations a vital part of overall corporate activity and the systems budget a significant share of operating expenses. In some cases, DP revenues are also significant. These developments are resulting in the DP audit or evaluation becoming an integral part of the assessment and/or due diligence process in corporate mergers and acquisitions.

Top management has had enough experience, learning after it was too late to do much about it, with systems being over budget and behind schedule. Independent audits offer an inexpensive early-warning signal, in a sense an insurance policy.

As more (and more complex) software products become available, systems managers will have to evaluate them and, in some cases, satisfy themselves that the firm providing these products is capable of supporting them.

Given that DP audits by outsiders will become an every-day element in the life of DP managers, how should managers prepare themselves to cope with them? First of all, by getting used to the idea. Second, by positioning themselves to "survive" an audit in reasonably good shape.

"Survival" techniques include:

- Designing systems with built-in audit trails, covering not only the accounting aspects normally thought of, but technical and security aspects of the system as well.
- Adopting and carefully exercising a system development methodology and related procedures. This will ensure that the house is not only in order, but appears to be in order.
- Knowing how audits are executed, for three reasons: (a) to be able to anticipate what the auditors will require and to be able to assist them; (b) to be able to direct surveys of in-house projects for control purposes; and (c) to be able to evaluate software products being considered for purchase or the systems operations of firms to be acquired by your organization.

DP Path to the Top

Traditionally, CEOs and other top managers came from the sales, finance or operating departments, not from data processing. In fact, in many cases DP is part of another department and does not report directly to the top.

This is changing. Vice-presidents of information systems and people with similar titles and responsibilities now often report to the CEO. Moreover, their understanding of the systems under their control, which more and more pervade all aspects of the organization's operations, make DP managers excellent candidates for top positions. Considerations such as intelligence, motivation and managerial talent all being equal, the DP executive may very well have a distinct advantage over his peers as a result of his broad-based knowledge.

About the Author

Michael H. Marcus is president of SIC Systems, Inc., a consulting firm specializing in management of system development projects and assessment of the status of projects, most of which are for on-line applications. He was formerly vice-president, then president, of Real-Time Systems, Inc., where he directed development of general-purpose message-switching and time-sharing systems. Prior to that he was a senior systems analyst at Computer Usage Co. and a software engineer at Sperry Gyroscope Co.

Marcus has conducted several series of seminars for the University of Chicago, Center for Continuing Education, covering topics such as project management for system development, fundamentals of data processing for non-data processing professionals, real-time systems and system analysis and design.

He is a member of the panel of arbitrators for the American Arbitration Association for computer-related disputes. He received a B.S. in physics from New York Polytechnic Institute and did graduate work in applied science at Adelphi University.

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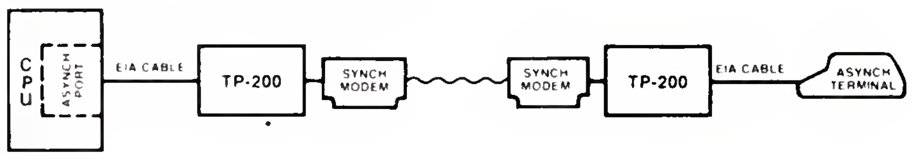

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Billion-Dollar Bank Makes Change in Security Setup

By Lois Paul
CW Staff

NEW ORLEANS — After reading about other peoples' security problems, a billion- dollar commercial bank here decided to bolster its own DP protection methods.

"It was just an increasing awareness in the whole industry that security is one area of the business that maybe hasn't gotten the attention it should have in the past," Reg Campbell, manager of information processing for Hibernia National Bank, explained. His bank's intention was to try "to get ahead of that ballgame."

Hibernia has an IBM 370/168 and an IBM 370/158, each with 6M bytes of memory running under MVS/IMS. Campbell's division consists of a little more than 100 persons.

"We're a service bureau as well as a bank," Campbell said, noting that Hibernia services about 20 savings and loans in its area. Moreover, "Some of the savings and loans have indicated an interest in retrieving some of their data through an intelligent machine," another motivation for seeking additional security.

But, he added, "We aren't willing to allow that until we are certain we can add all measures of security that are necessary."

The bank essentially had on-line logical terminal security built into IMS and normal application security. "We really didn't have a security package," Campbell said.

The bank did not feel these measures were a total solution. "It is just that there is more security out there than we have," Campbell said, and the question was, "What are the risks by not having that security?"

Goes to Consultant

Asked to recommend a DP consultant to analyze the need for security, a banking consultant Hibernia worked with suggested Art Gillis of Computer Based Solutions, Inc. "We took a look at where we felt our vulnerabilities were, both in software and internal within DP, as well as the use of the system," Campbell said. A risk analysis was completed which, according to Gillis, developed an inventory of 34 risk possibilities.

Gillis then performed assessments based on the degree of security in place to protect against the 34 types of crime.

Two major decisions resulted from the analysis. The bank will be developing a separate security control department and will be selecting and installing a security software package, Campbell said.

The security department will be formed under the data administration department in Campbell's division and it should be in place by early 1982.

The major software candidates are IBM's Resource Access and Control Facility and Cambridge Systems Group's ACF2. "We consider those two of the top products. We will do an analysis once we get our security department formed," Campbell said.

This story details one organization's method of beefing up its security measures.

Computerworld *is interested in hearing what your DP shop is doing in this area — the security risks and problems you have faced and the ways you are combating them.*

Send your submissions (no longer than six double-spaced, typewritten pages, please) to Rita Shoor, Senior Editor/Software, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

The security plan should affect DP and the end users. "We intend to control certain items of data that only certain users would be allowed to access," Campbell said. He suggested it would be more restrictive at certain levels of the user department than IMS with logical terminal security.

Gillis' role was to help the bank formulate a methodology. "He gave us some ideas of what we could do with our existing systems to beef up our security a little bit, which we have done."

Campbell's division already had felt the need for a security department and additional software. Gillis' recommendations to that effect helped firm these decisions.

T/S Exec Defends Security in Wake Of NCSS Story

By Lois Paul
CW Staff

ANN ARBOR, Mich. — Are all time-sharing companies vulnerable to the type of security breach that supposedly occurred at National CSS (NCSS), Inc. last year?

Richard Crandall does not think so. Crandall, the president of Comshare, Inc. here, another time-sharing vendor, recently discussed his concern about the impression that may have been conveyed by an article entitled "Case of the Purloined Password," written by Vin McLellan, that appeared in the *New York Times* this summer.

According to the article, the FBI has been "conducting a criminal investigation into a curious computer-age crime — the theft of an information file called a password directory from the electronic memory of National CSS, Inc." The article noted that "with the passwords, a thief would have access to the private files of the more than 8,000 companies that are NCSS customers."

While "no significant cash or data loss has yet been associated with the theft . . . the NCSS security scandal has badly jarred the huge $8 billion-a-year remote processing industry," McLellan wrote.

The problem at NCSS allegedly involved an employee whose job included knowledge of the firm's security procedures. NCSS itself has not been able to release its version of the story, pending completion of the FBI investigation.

However, Crandall's perception of what occurred at NCSS is that this "disgruntled employee" got hold of a block of passwords and, after being fired, was able to log back onto the NCSS system. He then made repeated attempts to apply the passwords against the company's files, according to Crandall.

(Continued on Page 79)

For IBM VM/CMS

MSA Revamps Financial System

ATLANTA — Management Science America, Inc. (MSA) has unveiled a new version of its Financial Forecasting and Modeling System (FF&M) that operates with Release 6.1 of IBM's VM Conversational Monitor System (CMS).

FF&M is said to give VM/CMS users a fully interactive facility for forecasting, financial analysis, modeling, budgeting and "what if" analysis. An interface to the MSA General Ledger System to retrieve historical data is also available.

Using CMS, interactive forecasting and modeling with FF&M lets users enter model data and receive modeling results interactively from a computer terminal. The terminal and keyboard replace the card reader, printer and card punch used with batch forecasting systems.

Prices for the system range from $35,000 to $50,000, MSA said from 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

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Time-Sharing Executive Defends Security in Wake of NCSS Story

(Continued from Page 77)

There are at least three rules of security that should be in any time-sharing system, Crandall maintained. The first is all passwords should not be stored in a single block..

"The old adage that the best place to hide a tree is in a forest means that one ought to . . . store passwords diffused throughout other data all over the place, so nobody really knows where it all is," he added.

The second "level of defense," according to Crandall, is to encrypt the stored passwords. His third rule is that the use of another computer to make repeated attempts to crack a target computer and its passwords should be detected and reported. "I get a report every week from our operations staff of the number of attempted unsuccessful uses of a password," Crandall said.

A system should stop a person after a small number of repeated attempts to crack the password, he added.

"The whole question is whether one has the security mentality and whether you're really serious about making sure you know when things are going wrong and chasing down attempted security breaches," Crandall said, contending "one of the big problems that NCSS has had is that it is running on an IBM operating system base and, all of its $30 million investment in security aside, the standard IBM security is very low and very inadequate."

He suggested that IBM users could program their own additional security functions or perhaps buy security packages, if these are available. "But apparently NCSS didn't do that, at least in this area of security where they had the breach," according to Crandall.

One should not have a "user beware" type of security system, but a system that imposes some of the responsibility on the users themselves, he added.

As to whether time-sharing companies are more vulnerable regarding security than in-house DP systems, Crandall said it depends on whose security theory you go by. If you subscribe to the belief that the most vulnerable element is the people — the operators and programmers — then the risks are equivalent, he explained.

Regarding on-line time-sharing, he said the only reason these services are more vulnerable to security breaches is because the telephone lines used can be breached. He suggested encryption of the data transmitted to counteract this potential risk.

Relational DBMS Offered For Unix Operating Systems

CAMBRIDGE, Mass. — Logical Software, Inc. here unveiled Logix, a relational data base management system (DBMS) for Unix and Unix-like operating systems.

Logix reportedly provides the tools required for integrated, interactive and programmatic data base management. With Logix, a user can define relations, enter and edit data, create new relations that are subsets or supersets of existing ones and select items from a relation according to complex conditions, the vendor explained.

Logic can be used to generate reports, print forms and upgrade relations using interpreted or compiled queries. It is said to provide mechanisms that insure the integrity of data stored in a relation and will report items that violate user-specified integrity constraints.

The software is said to provide a set of tools for accepting data in various input formats and handling output data conversions. A Logix data base is a Unix directory, with various files containing data, queries and auxiliary information and a subdirectory that holds the relations and indexes.

Logix is available immediately for $5,000 from Logical Software, Inc., 1218 Massachusetts Ave., Cambridge, Mass. 02138.

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UCC Offers Relational DBMS

DALLAS — University Computing Co. (UCC) announced here that it is offering a relational data base management system (DBMS) called DB4 on its national timesharing network.

The software reportedly addresses business and scientific needs by including many types of diverse data in the same data base. Its features include a tabular data structure for data base definition, which mirrors "real world" occurrence of data.

Predefinition of data relationship is not necessary, the vendor said, adding that through two commands DB4 can build any logical data relationship that exists in the data base.

The Query language with DB4 has seven commands that are available in interactive batch mode or via Fortran or Cobol program control. The report writer has automatic features such as breakpoint totaling, cumulative totals and a calculate verb.

As it is available on UCC's time-sharing network, DB4 is priced on a per transaction basis. The vendor is located at UCC Tower, Exchange Park, Dallas, Texas 75235.

Planning, Analysis Service Designed for Credit Unions

GREENWICH, Conn. — A computerized planning and analysis service designed to allow credit unions to manage their operations while providing planning tools has been announced by The Service Bureau Co.

Focus Financial Planning system digests the summary data of day-to-day loan and share transactions, giving credit union managers composite information in a form that will allow them to project and model for future growth, according to the company.

The service provides users with reports and graphs.

Focus is priced according to operational size. Additional information is available from The Service Bureau Co., 500 W. Putnam Ave., Greenwich, Conn. 06830.

DEC Packages for VAX-11 Feature Graphics for Business, Science Uses

MAYNARD, Mass. — Digital Equipment Corp. has announced software packages for its 32-bit VAX-11 processor said to incorporate a broad array of graphics capabilities for business and scientific uses.

VAX-11/RGL (Regis Graphics Library) was designed for the company's VT125 CRT/graphics terminal and is suited for low- to medium-resolution graphics and data plotting with two-dimensional applications using up to four colors, the company said.

The software allows users to develop new graphics programs through the use of special features such as transformations, coordinate system support and definition of viewports to obtain flexible and segmented subscreen management, the vendor claimed.

A supported VAX-11/RGL carries a one-time license fee of $6,000, according to a DEC spokesman. DEC is headquartered at 111 Powder Mill Road, Maynard, Mass. 01754.

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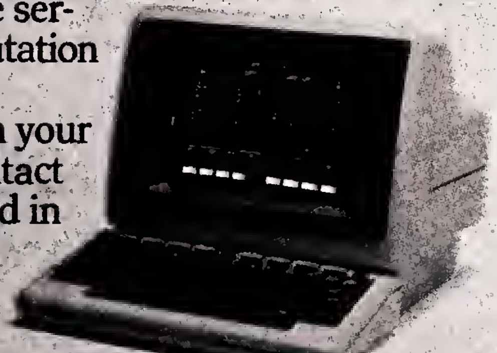

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Versatec Plot Tool Offers Random Element Format

SANTA CLARA, Calif. — Versatec, Inc. has introduced Versaplot Random, an electrostatic plotting software package that reportedly represents data in a more powerful "random-element" form called Versatec Random Format.

Versaplot Random packages are integrated for use with IBM mainframes running under OS and Digital Equipment Corp. VAX and PDP-11 systems.

The new format is said to reduce the amount of data to be processed and the associated requirements for memory and data output, the vendor said.

A random element can be a Draw command, a polygon and its number of sides or a text string in multiples of 16 char./ string, the vendor explained.

The Fortran-callable commands reportedly support plotting of any graphics representation on most Versatec plotters or printer/plotters. Extended graphics capabilities include grid overlay, area shading and toning, according to Versatec.

Plots defined by less than 50,000 random elements are said to require no sorting and those of more than 50,000 elements are sorted into large bands.

Used with Versatec random element processors, plotting workstations or remote plotting workstations, Versaplot Random reportedly completely off-loads host computer data ordering and raster conversion.

The software is priced at $5,500 for the IBM package, $3,500 for the DEC VAX and $2,000 for the DEC PDP-11. Delivery is 60 days from receipt of order, the vendor said from 2805 Bowers Ave., Santa Clara, Calif. 95051.

'Auto-Soft' Program Aid Runs on Basic Four Gear

ATLANTA — Computer Software, Inc. announced Auto-Soft, a programming tool to allow users of Basic Four Corp. computers to generate and document software systems without manual coding.

Using Auto-Soft to generate a maintenance or data-entry program, the user reportedly types on a terminal exactly what the finished screen will look like. The vendor said the software generates from this input a complete program, file layouts and user documentation.

Associated data files are said to be automatically defined and programs are linked to menus for immediate selection. Auto-Soft also includes a reporting module complete with optional updating features.

The complete package sells for $10,000, including training. It also is said to be compatible with Basic/Four Standard CBS III application software.

Corporate headquarters for Computer Software, Inc. are at 6675 Peachtree Industrial Blvd., Atlanta, Ga. 30360.

System/34 Medical Users Get 'Ombas' for Accounts

LINTHICUM, Md. — A package said to offer a specialized approach designed to resolve many of the administrative problems facing medical practices has been announced by Software Associates, Inc.

The Online Medical Billing and Accounting System (Ombas) is menu driven to lead operators through the proper office procedures and has a two-level structure that facilitates rapid reconfiguration to conform to existing office procedures, the company said.

Ombas also provides management with current and historical patient analyses and is structured to allow for expansion as the practice grows, the vendor claimed.

Ombas runs on any configuration of the IBM System/34 and is priced at $10,000 from Software Associates, Inc., 607 S. Camp Meade Road, Linthicum, Md. 21090.

'Sharp APL' Gets Enhancements

TORONTO — I.P. Sharp Associates has updated Sharp APL for its time-sharing customers and in-house users.

Included in the enhancements are new operators, functions, the addition of enclosed arrays, complex numbers, full-screen management support for IBM 3270 series terminals, S-Task Facility and access to OS data sets.

The release is available on Sharp's time-sharing service or can be provided in-house with a monthly fee based on user tasks, the vendor said from 145 King St. W., Toronto, Ont. M5H 1J8, Canada.

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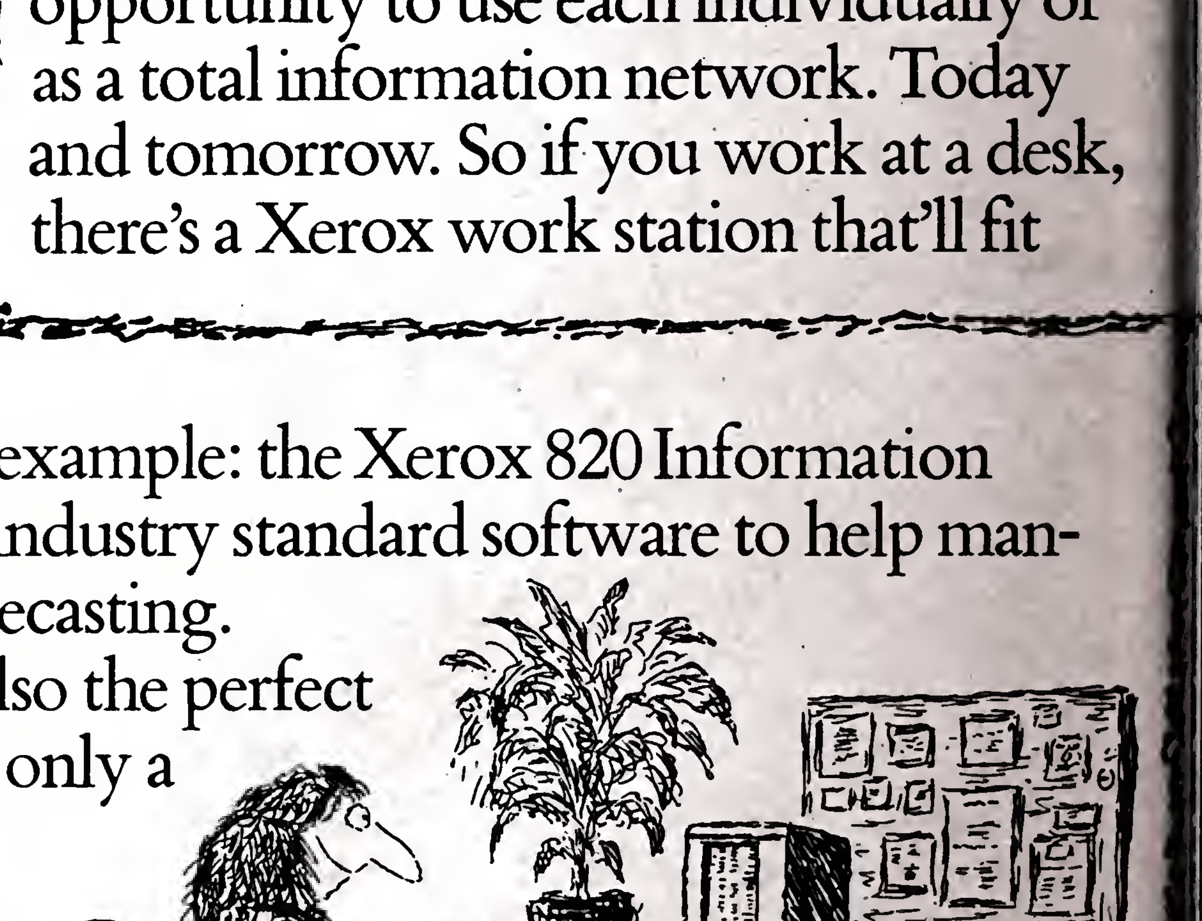

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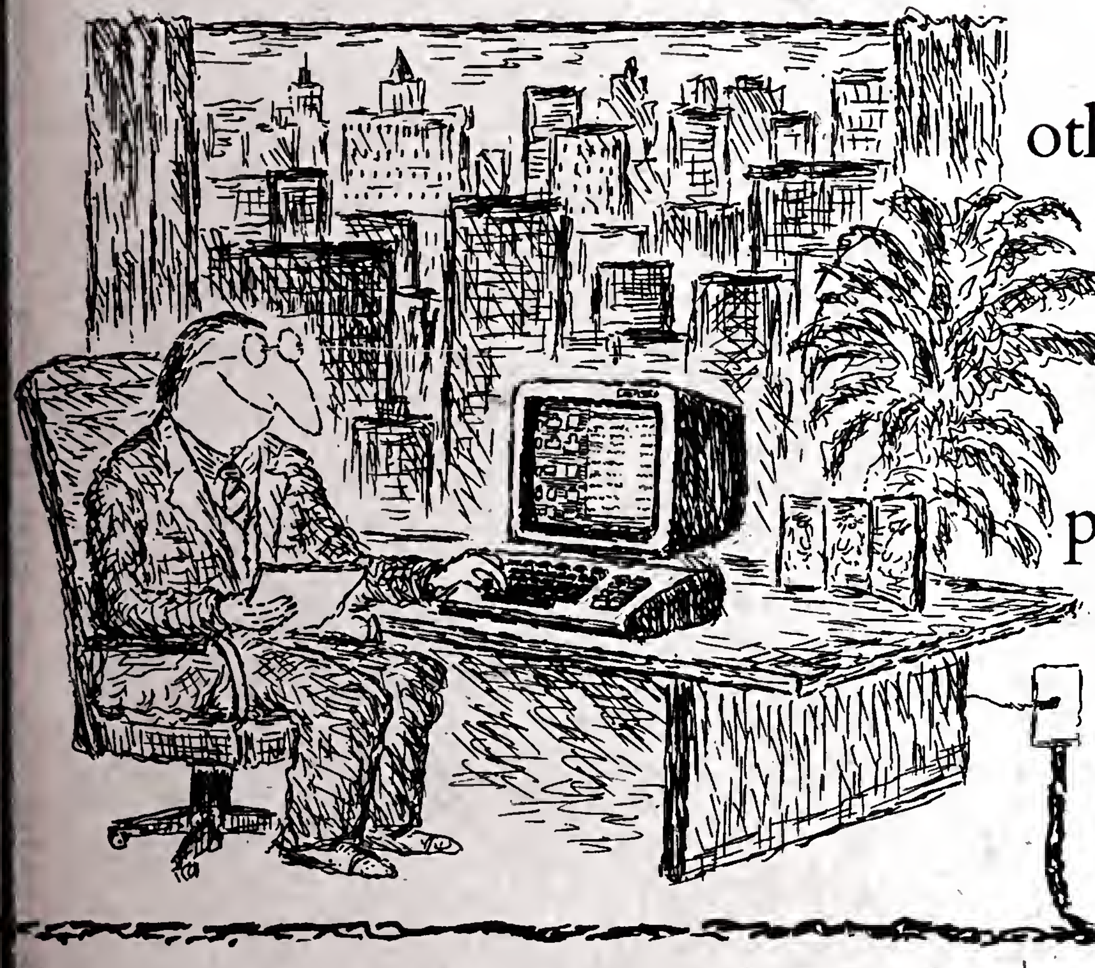

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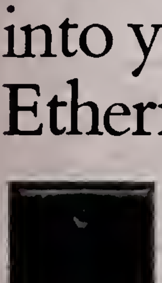

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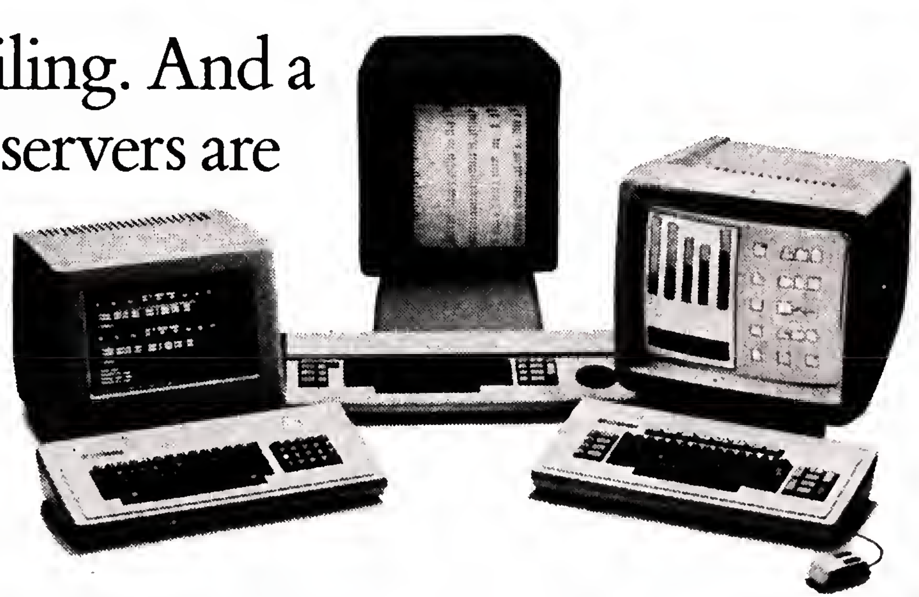

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DEC PDP-11, VAX Systems Get Electronic Spread Sheet

REDMOND, Wash. — An electronic spread sheet program designed for Digital Equipment Corp.'s PDP-11 and VAX systems was introduced here by Why Systems, Inc. (WSI).

Dubbed Digicalc, the package serves many of the same needs in a commercial environment as Personal Software, Inc.'s Visicalc product handles for microcomputer users, according to a WSI spokesman. Training time for an inexperienced operator to work with the software is "less than one hour," he claimed.

Able to run under DEC's RSTS/E, VMS and RSX11-M operating systems, Digicalc displays a tabular worksheet on a VT-100 CRT terminal that the end user fills in with the appropriate equations, values and textual data, he said. The program then calculates the entered equations and recalculates them each time related data is added or changed. Worksheets may be saved, recalled or consolidated and reports are printed on an as-needed basis.

Suggested Digicalc applications include financial modeling, investment and resource management, job costing and generation of budgets and pro forma financial statements.

Available immediately, the RSTS/E version costs $2,500 and the Vax version is priced at $3,000 from WSI at 20915 N.E. 77th St., Redmond, Wash. 98052.

System Handles Library Catalogs

STANFORD, Calif. — The Research Libraries Group here announced its RLIN II integrated technical processing system to provide on-line support to the acquisitions, cataloging and authorities creation and validation done in the libraries of its 37 member institutions.

The RLIN system is used to enable acquisition staffs to build on already-existing bibliographic records when creating and maintaining library-specific acquisition records.

It is priced per unit, with derived and not upgraded records priced at $2.05; derived and upgraded records cost $1.60; and original but not catalog standard records handled for $1.83. There is no charge for original catalog standard records. The Research Libraries Group, Inc. is at Jordan Quadrangle, Stanford, Calif. 94305.

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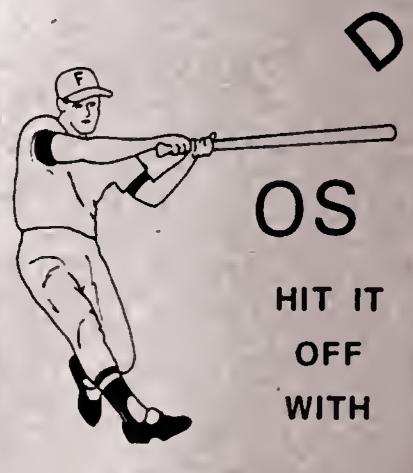

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For IBM: 100 and 200 MB 12-high packs, top and front-load single disk cartridges.
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'Handler' Develops, Maintains Application Systems on HP 3000

SAN LUIS OBISPO, Calif. — Computer and Software Enterprises, Inc. has announced Handler, an application system development and maintenance tool for Hewlett-Packard Co. 3000 systems.

Handler reportedly provides services ranging from demonstration of an application system prior to programming, through development using its testing facilities and into maintenance.

Its menu linkage controller is said to provide a standard method of defining linkages between menus, application programs and batch jobs. The demonstration facility reportedly allows a user to see how the application will look before any programs are written.

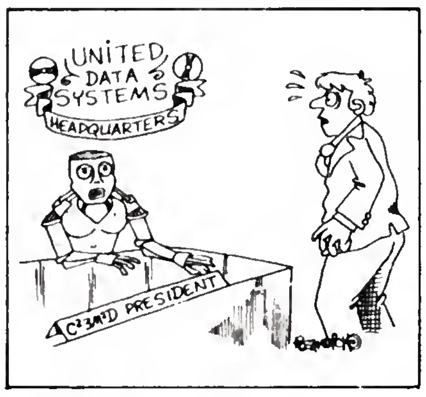
Handler also includes a security scheme to limit access to menu options, table-driven function key definition and labeling and a stream file customization facility.

It currently operates in both MPE III and MPE IV environments and requires V/3000 and Ksam/3000. The one-time license fee of $4,500 for Handler includes full documentation.

A maintenance agreement and one-day technical class are also available from the vendor through P.O. Box 1766, San Luis Obispo, Calif. 93406.

BCS Services Aid Analysis, Of Concrete Structures

SEATTLE — The time required for analysis/design of reinforced concrete structures reportedly can be shortened by using three service offerings from Boeing Computer Services Co. (BCS).



GTSTRUDL / Reinforced Concrete (GTSTRUDL/RC), Systems Professional (Syspro) and Post-Tensioned Design (Posten) are said to help the structural engineer design or check reinforced concrete and members without having to make repetitive calculations. All three service offerings are available via the BCS Mainstream-EKS remote computing service. The firm can be reached through P.O. Box 24346, Seattle, Wash. 98124.

Utility Expands HP 3000 Communications

MT. VIEW, Calif. — IER, Inc. has unveiled a system utility that expands and enhances the communications capability of the Hewlett-Packard Co. HP 3000 computer.

The News Communication Facility allows system management to broadcast news releases to all users and keep track of which news releases each user has received.

As a user signs on the system, he is automatically shown the latest news releases. However, he will only have to review them once.

Any user releases reviewed previously will not be rebroadcast, the vendor noted.

The News Communication Facility costs $1,800 for purchase and $300/mo on a lease plan, according to the vendor.

IER is located at 1916 Old Middlefield Way, Mountain View, Calif. 94043.

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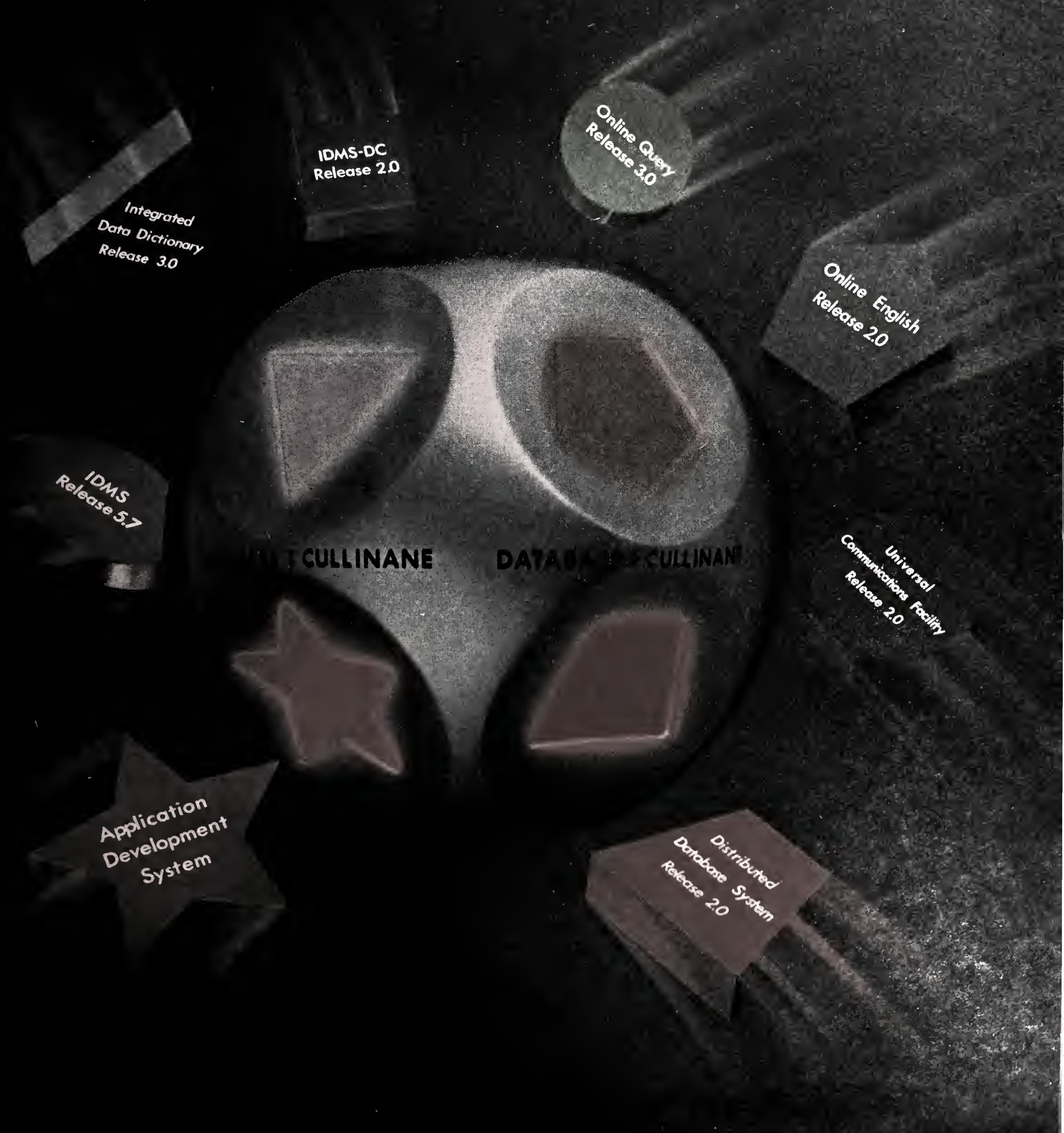
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IDMS Release 5.7 A production DBMS with relational access. Its logical record facility lets application programmers view data as a flat file. It can be easily used even by someone without knowledge of the database structure. And IDMS fully supports native VSAM files.

Application Development System ADS-OnLine offers the most dramatic improvement in programmer productivity ever. It reduces the complexity and effort required to develop online applications to access and update the database. It automatically develops transactions from the user's English-like definition of the process to be accomplished, all under control of a data dictionary. ADS-Batch does the same for batch oriented applications.

Integrated Data Dictionary Release 3.0 With online inquiry and update capabilities. IDD, the single point of integration for all Cullinane products, provides the control necessary for production processing. In addition to containing all standard entities such as file and record definitions, it also allows users to create their own dictionary entities. IDMS-1982 is the only database management system fully under the control of a data dictionary.

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Distributed Database System Release 2.0 Lets programs access data stored on any CPU in your network. Now you can distribute data to remote locations for processing and access or update the data from any program running in any network CPU. DDS also allows establishment of a back-end database machine to handle all database services thereby reducing the host processor's work.

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Lets computer users get fast answers to technical and business questions. Users ask questions in a simple English-like language and get back on the terminal a formatted report. OLQ also offers extensive sorting and computation capabilities.

OnLine English Release 2.0 Gives users direct access to data using the English language. It requires no training. The system can be tailored to fit your business language.

Universal Communications Facility Release 2.0 Applications developed with UCF will run under any teleprocessing monitor without modification.

ESCAPE Permits users of other DBMS products such as IMS/DL1 to migrate easily to IDMS.

CULPRIT/EDP-Auditor CULPRIT, an online report generator, allows non-programmers to create files or reports. EDP-Auditor, a special version, includes a library of generalized audit routines for tasks such as confirmations, file footing and exception analysis.

INTERACT A text editor which minimizes development time by providing for online entry of source statements. It also offers word processing facilities for the creation and maintenance of all types of text.

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Cost Translator Out for Fortran 77 CPUs

UPLAND, Calif. — An on-line cost estimating translator that is available on mainframes using Fortran 77 or equivalent compilers, or on a time-sharing basis, was announced here by Foothill Associates.

Facet reportedly enables the user to modify and produce cost estimates and pricing work sheets, as well as the forms required to support any DD633-type proposal.

During the bid preparation process, tasks for project registers are entered and processed interactively, the vendor said.

Registers may be saved and recalled for further processing, modification or consolidation, a spokesman added.

Facet is available for $7,500 for a perpetual license or for $500/mo. Time-sharing costs are on an as-used basis.

Foothill Associates is located at 1730 N. Euclid Ave., Upland, Calif. 91786.

Bradford's 'IDPS' Designed For Truck Routing, Scheduling

HOUSTON — Bradford Information Systems, Inc. has unveiled the Interactive Distribution Planning System (IDPS), which can be used for truck routing and scheduling, distribution planning and modeling, site location studies and the assignment of distribution centers to the user locations based on distance.

IDPS users have access to a data base of 3,000 cities and towns in the U.S. with a location directory listing points alphabetically by state. Additional points can be added to the data base on request, according to the vendor.

IDPS is available on the Control Data Corp. Cybernet time-sharing network.

The charge for IDPS is $1,000/mo for unlimited use or royalty based upon resource units used/mo. The IDPS user information manual costs $15.

Bradford can be reached through P.O. Box 73111, Houston, Texas 77090.

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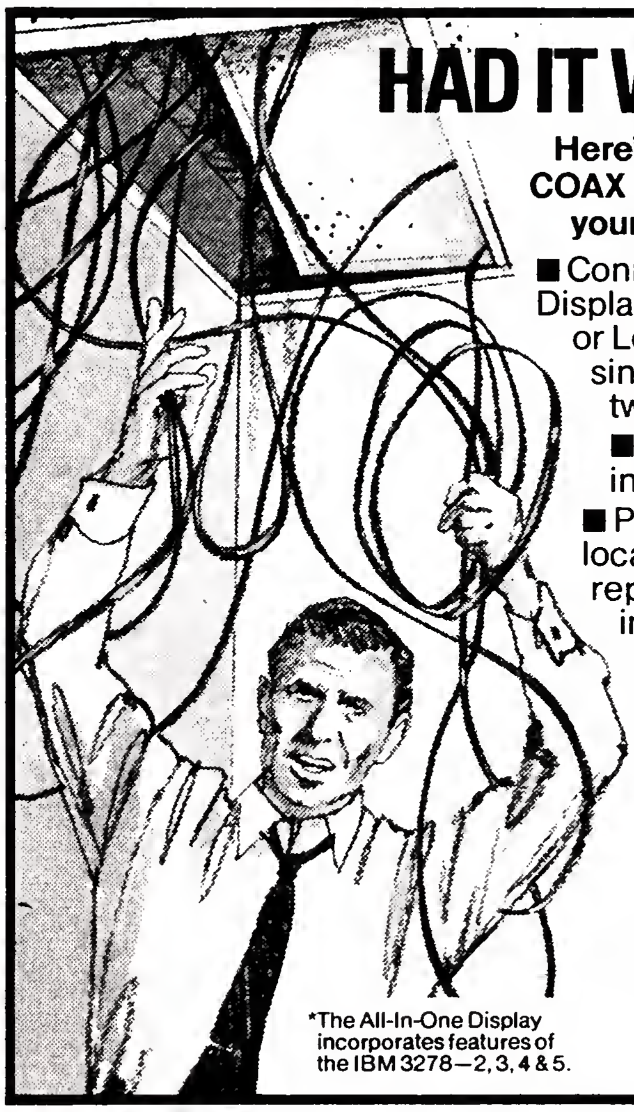

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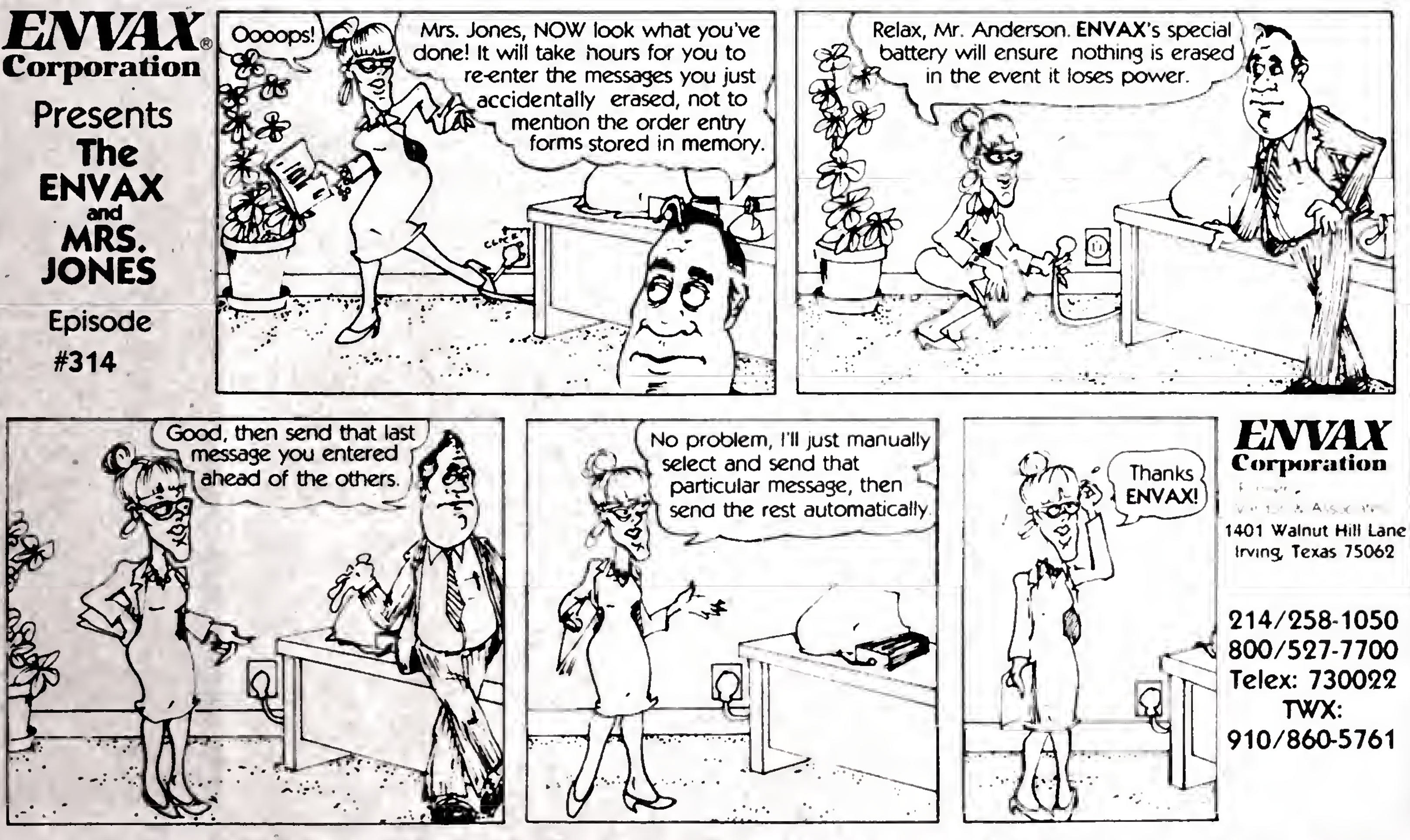
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- *Find out if program products are used.*
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- *Decide if interactive compilations should be restricted.*
- *Implement an effective audit trail of interactive program usage.*
- *Determine how to systematically manage an applications programmer's use of TSO.*
- *Evaluate the reliability of the TSO system.*
- *Explain that TSO will rapidly be used for many applications other than program development.*

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Emulex Adds Multiplexer For PDP-11

SANTA ANA, Calif. — A multiplexer that allows the simultaneous concentration of both synchronous and asynchronous communication lines on Digital Equipment Corp. PDP-11 computers is available from Emulex Corp.

The CS11/V is said to include all the capabilities and performance of the DEC DV11 system. It offers the capability to connect up to 32 synchronous and asynchronous line devices to a single controller board housed within the CPU backplane, the vendor said.

Synchronous and asynchronous line interfaces of all types, including current loop as well as RS-232C with full modem control as a standard feature, may be mixed in groups of eight lines.

A basic configuration of one controller and one distribution panel, with an adapter for eight communication lines, is priced at $4,925; a 16-line system costs $6,200; a 24-line system, $8,425 and a 32-line system, $9,700, Emulex said from 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Dasher D200 Goes Katakana

WESTBORO, Mass. — Data General Corp. is offering a Japanese language version of its Dasher D200 alphanumeric I/O terminal.

The Katakana language display includes Dasher features such as a detached native typewriter style keyboard, tilt/swivel display housing, internal screen management software and selectable asynchronous communications rates up to 19.2K bit/sec, the vendor said.

The Katakana Dasher D200 costs $2,350 from DG at Rt. 9, Westboro, Mass. 01581.

Timeplex Unveils Data Concentrator To Simplify, Lessen Cost of Links

NEW YORK — Timeplex, Inc. recently unveiled a data concentrator system designed to simplify and lessen the cost of links between remote terminal clusters and host minicomputers.

The E/Series data concentrator system weighs 26 lbs. when its chassis contains a regularly featured asynchronous statistical multiplexer, optional modem and optional synchronous stat mux.

Up to eight channels in the asynchronous stat mux can run simultaneously at 9,600 bit/sec, allowing a maximum aggregate data speed of 76.8K bit/sec.

The user can include the optional integral modem, which delivers 2,400-, 4,800- and 9,600 bit/sec speeds or run the E/Series system with a freestanding modem.

'Lower Tier'

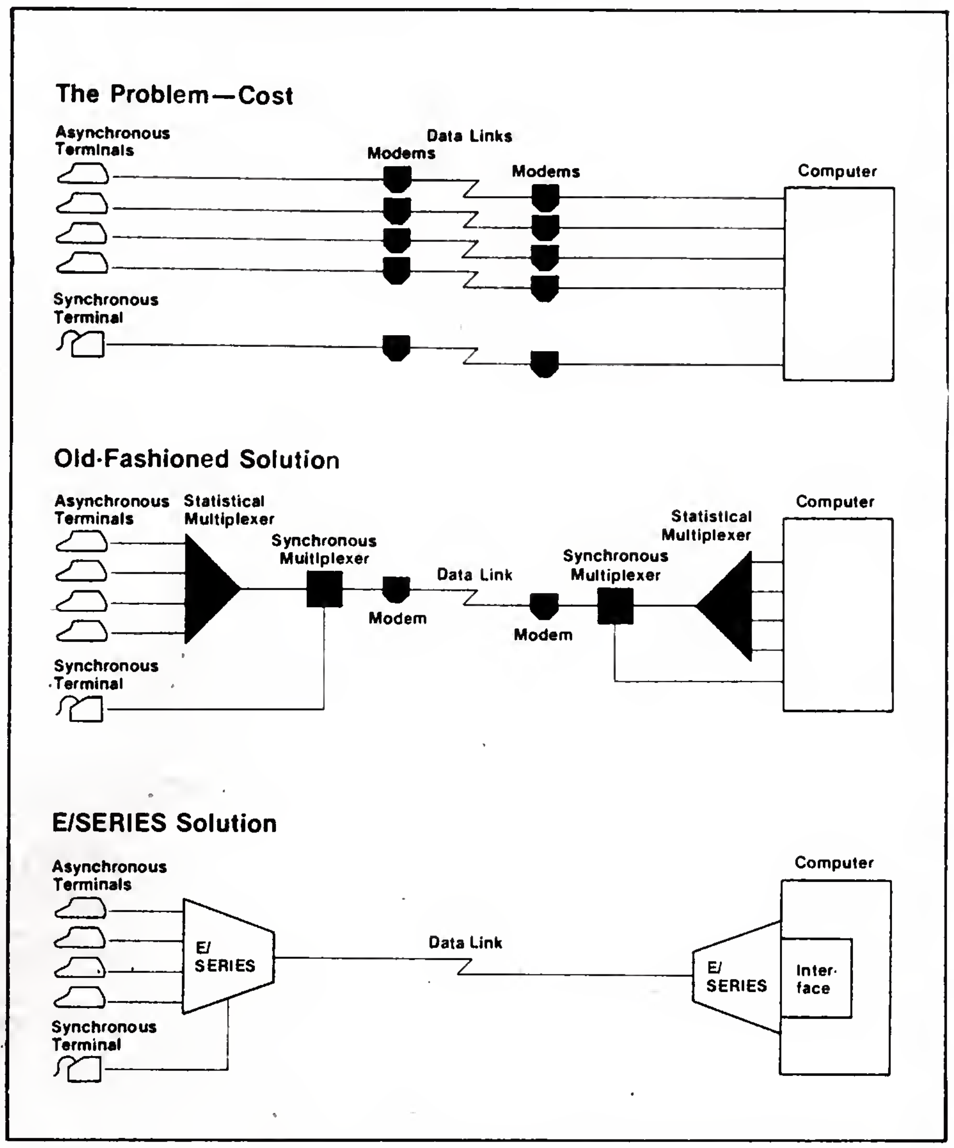
Featuring a 16K-byte buffer and built-in diagnostics, the E/Series is aimed at what Timeplex marketing strategists termed the "lower tier" of data communications users: point-to-point networks with a limited number of ports.

With the data concentrator system, Timeplex hopes to scotch "a general belief that setting up a point-to-point mini-based data communications system is too complicated and the payoff not worth the trouble.

"In the past," the spokesman observed, "it's involved dealing with a variety of vendors to obtain the different elements of the system, followed by a difficult installation procedure."

To eliminate such problems, he said, the E/Series system can support a number of asynchronous terminals, concentrating data over a single phone line while providing "virtually error-free" transmission. Timeplex included the synchronous stat mux option to allow a synchronous terminal or remote job entry station to efficiently share the same phone line with the E/Series' asynchronous companions. An eight-channel E/Series costs $2,250; a four-channel system goes for $1,650.

Timeplex is headquartered at One Communications Plaza, Rochelle Park, N.J. 07662.



Point-to-Point Data Communications as Depicted by Timeplex

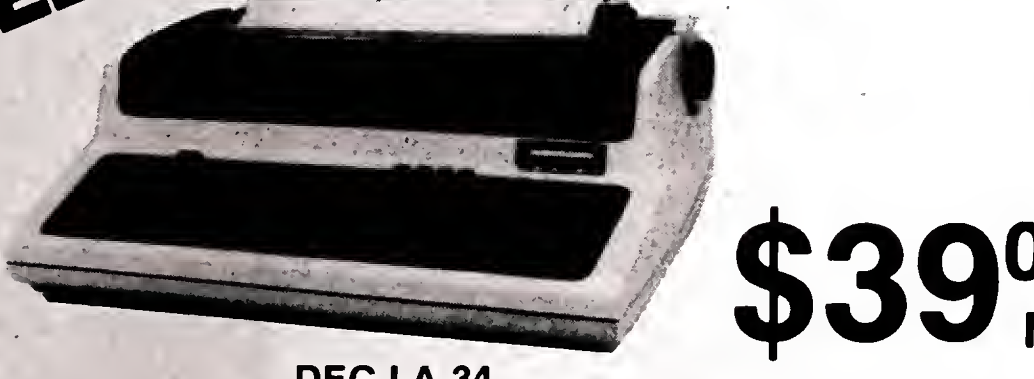
Bell-Compatible Modem Works at 0- to 300 Bit/Sec

CARRBORO, N.C. — Datec, Inc. has unveiled a 0- to 300 bit/sec Bell-compatible originate/answer modem.

The Datec 33 features a front panel voice/data button, long space disconnect, five diagnostic tests, built-in "A" control and modular design for rack applications, according to the vendor.

It will operate using any type of telephone over dial networks or over two-wire leased lines. The computer/terminal interface is a standard RS-232C connection.

The price for the modem is $399 stand-alone and $325 in card form, Datec said from 300 E. Main St., Carrboro, N.C. 27510.



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Switch Marks Bell's Move To U.S. Net

SENECA, Ill. — The Bell System has announced its latest stored-program switching system, a local- and toll-digital switch said to be a significant step in Bell's evolution to a nationwide digital network.

Known as No. 5 ESS, the switch has been designed as a world class product for both domestic and international markets and will work with 24- and 30-channel digital line facilities.

The first installation, planned to go in here, will be followed by a rapid build up of production capability with the expectation of shipping one system per day by 1984, a company spokesman said.

The system makes extensive use of a special-purpose microcomputer chip called the Digital Signal Processor, able to perform a million functions per second. The system connects directly with digital lines; analog lines interface with the system through a newly designed solid-state concentrator.

Modem Includes Range of Speeds On Voice Lines

NEWPORT, R.I. — A modem with switch-selectable data rates of 9,600-, 7,200- and 2,400 bit/sec over 3003 voice-grade circuits is available from Avanti Communications Corp.

The Avanti 96 was designed for full-duplex, point-to-point applications and utilizes digital modulation techniques that allow maximum phase jitter compensation and equalization for medium- and long-haul circuits.

The digital adaptive equalizer eliminates the need for manual adjustments. In addition, built-in diagnostics allow the operator to isolate failures within the communications link or evaluate system performance through local or remote analog and local or remote digital loopbacks. The modem costs $2,950 from Avanti at Aquidneck Industrial Park, Newport, R.I. 02909.

DANGER ALERT!
CORROSION STARTING IN MEMORY BANK... -ER-A-FORGOT WHAT SECTION

For Network Users

IDS Offers Testers, Modem Eliminator

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has unveiled a data communications tester, bit error rate tester, modem eliminator and catalog of data communications products.

The Model 4020 data communications tester performs interactive troubleshooting associated with the RS-232 interface. Data traffic and all system parameters are displayed on a one-line, 20-char. alphanumeric read out, for $3,595, the vendor said.

The Model 65/60 bit error rate detector has been enhanced to test asynchronous modems operating at 1,800 bit/sec.

In addition, it contains separate transmitter and receiver sections, allowing full-duplex tests to be performed in either end-to-end or loopback configurations. It costs $915.

The Model 6100 Modem Eliminator was designed to allow the interconnection of data terminal equipment without modems, according to the vendor.

It can be used in either asynchronous or synchronous modes and with terminals configured for half- or full-duplex operations. It costs $710.

The IDS data communications catalog describes the vendor's complete line of data communications equipment including limited distance modems, terminal, port and modem-sharing devices and modem eliminators.

There is no charge for it, IDS said from 7 Wellington Road, Lincoln, R.I. 02865.

Before the Northrop F-5G gets off the ground, it has to fly on a Harris computer.

Northrop's high performance F-5 tactical fighters are the most widely deployed fighter aircraft in the free world. A refined version of the F-5, the F-5G "Tigershark," will be delivered in 1983.

A pair of Harris 800 computers, in concert with twelve other Harris computers, are playing a key role in the development of this aircraft by driving Northrop's two development simulators, as well as being used for interactive program development.

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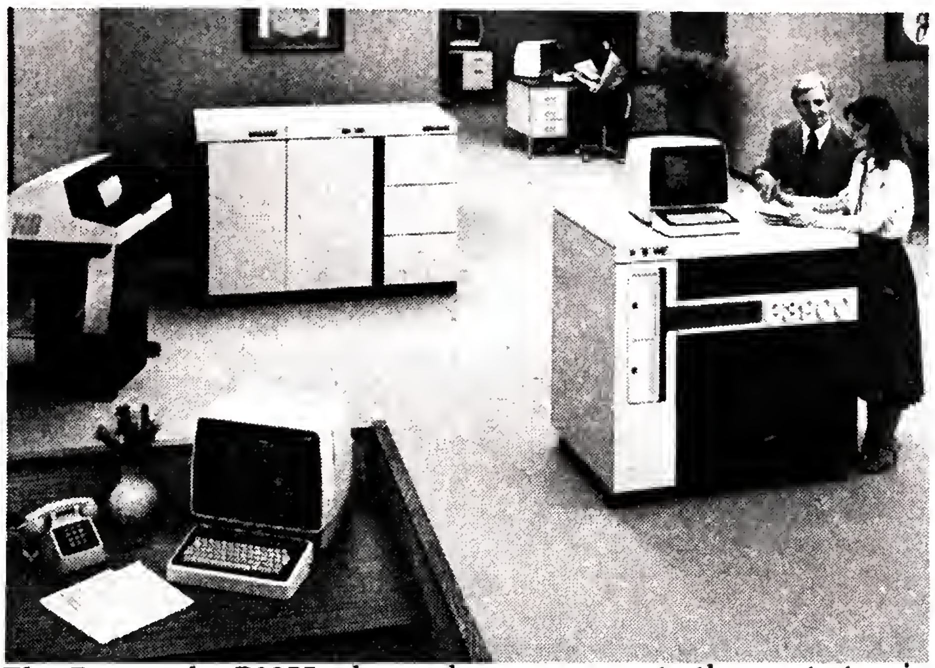
B3955 Based on LSI

Burroughs Scraps B3950 for Smaller Unit



The Burroughs B3955, shown here, represents the next step in CPU power from the B2900.

DETROIT — Burroughs Corp. has scrapped its troubled B3950 processor and replaced it with the B3955, a physically smaller processor based on large-scale integration (LSI) technology.

Announced in 1979 as a competitor to IBM's 4341 processors, the 3900 project has been plagued by problems that have delayed it almost two years. The problems were based in the modular design of the B3950 processor.

While the B3955 retains the same modular design, LSI logic chips are now being used, industry sources said. Burroughs said the B3955 offers about the same performance as the B3950, which was never delivered.

The B3955 offers about the same throughput as the B3950 (about twice the throughput of the earlier B3800 series) and can be configured with up to 5M bytes of main memory. It can be equipped with up to 32 data link processors and Burroughs I/O controllers. Up to four CPUs can be linked together to share a common disk file storage.

Logical Upgrade

Burroughs said the processor is a logical upgrade from the smaller B2900 line of processors as well as the older B3800. The processor is compatible with all Burroughs in the medium-systems category, the firm said.

The B3955 is based on micromodular concurrent architecture in which the steps comprising a processing task are performed by independent modules operating concurrently. Burroughs claims the processor is a pipeline processor, which computes more efficiently than the earlier B3950. In addition, Burroughs said users can get additional throughput by installing the recently announced CP 3680 front-end processor.

Memory is composed of 16K bit chips and logic circuits employ LSI technology with circuit densities of up to 1,000 gates per chip, the vendor said.

Burroughs said the system is designed with "user friendly" characteristics with software including the MCP operating system, a generative data base management system, a network handler and report writers. In addition, Burroughs is offering standard applications software for the system.

Up to 32 data link processors (DLP) can be attached to the system. The units, which are independent processors, are programmed to service a particular

(Continued on Page 98)

IBM 288K-Bit Chip Based on Samos Technology

ESSEX JUNCTION, Vt. — IBM engineers here have come up with a 288K-bit memory chip that can store four times as much data in twice the space of what was formerly IBM's largest memory chip, a 72K-bit version.

Still in the experimental stages, the chip is an extension of IBM's silicon and aluminum metal oxide semiconductor (Samos) technology used to manufacture the company's 64K- and 72K-bit chips as well as several other high-density memory components.

The 288K-bit chip was fabricated at IBM's Burlington, Vt., manufacturing facility on the same manufacturing line as the 72K-bit chip, which IBM noted is believed to be the largest capacity dynamic random-access memory chip in volume production anywhere.

A batch of 65 fully functional 288K-bit chips was produced on the line to prove the design could be manufactured in standard production environments.

The chips were fabricated on 32 silicon wafers, 82mm in diameter, according to the vendor.

IBM said it currently does not have plans to include the chip in its commercial manufacturing program and details of the chip development process will be available at a later date.

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Two CRT Terminals Offer Raster Scan Color Graphics

LAFAYETTE, La. — Two CRT terminals offering high-resolution raster scan color graphics are available from Phoenix Computer Systems, Inc.

The Raster 640 and Raster 320 terminals feature pixel-adressable graphics with applications in business graphics, weather mapping, scientific analysis and process control.

The two models can communicate with any host computer via a standard RS-232C interface and offer resolutions of 640 by 256 pixels and 320 by 256 pixels. A standard parallel Ascii printer interface is supplied along with an RS-170 interface for an RGB video monitor or hard-copy device, the vendor said.

The two terminals start at $4,795, Phoenix said from 110 Board Road, Lafayette, La. 70508.

Burroughs Scraps B3950

(Continued from Page 97)

category of peripheral devices. The DLPs share the overhead connected with I/O functions, freeing the central processor for processing tasks and allowing multiple paths to high-speed peripherals, Burroughs said.

Up to three additional processors can be attached to a B3955 through a shared system processor that allows the processors to share peripherals, disk storage and communications subsystems. This environment can be used for a full-time back-up operations in systems that must operate around the clock, Burroughs said.

On-line diagnostic routines allow field engineers to test system operation without taking the system off-line. In addition, remote diagnostic routines can be run from designated support locations using dial-up modems, Burroughs said.

Burroughs said the B3955 is physically smaller than the B3950, requiring 47% less floor space and using 25% less power and air conditioning.

The system will be available in the fourth quarter of 1981 and a basic system costs $290,000 plus maintenance. One-year lease prices start at $11,000/mo including 24-hour, seven-day, field engineering service.

Dennison Announces Tape Upkeep System

WALTHAM, Mass. — Dennison Kybe Corp. has announced a computer tape maintenance system that reportedly creates a middle ground between tape evaluators and tape cleaners.

The MLC-400 features the ability to inspect common tape types for defects. In larger operations, the unit can be used for tape backup as well as for evaluating live data reels without erasing stored information, the vendor said.

Units cost from $4,845, the vendor said from 82 Calvary St., Waltham, Mass. 02254.

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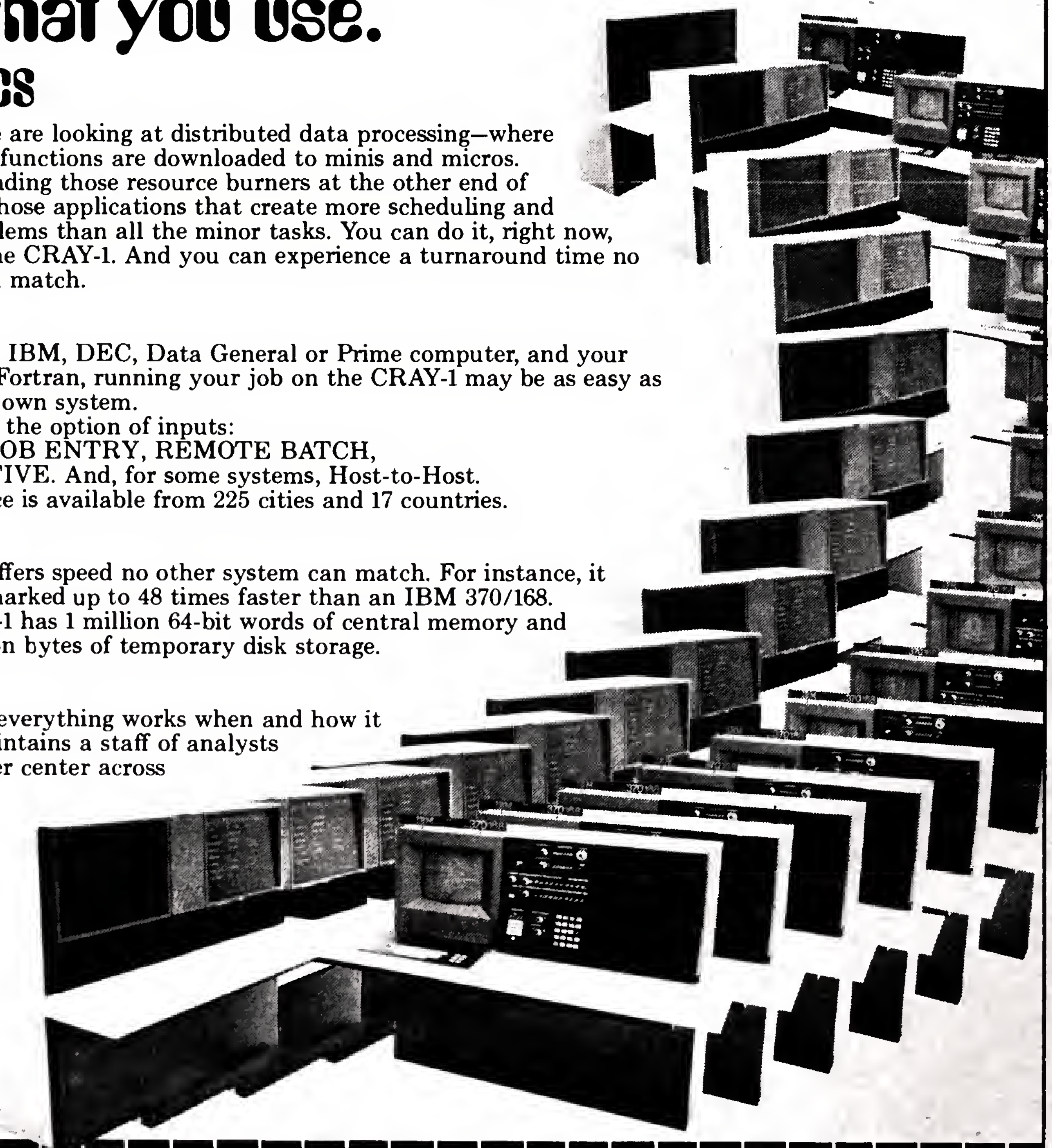

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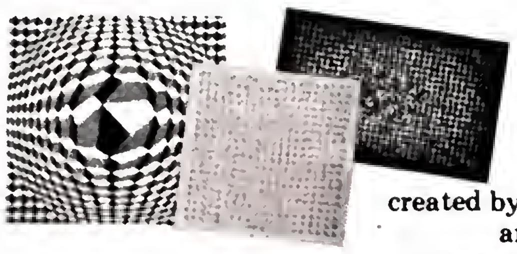

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Reduces Errors, Costs

Roofing Firm Builds on Distributed Net

E. WALPOLE, Mass. — Bird & Son, Inc., a leading manufacturer of roofing products, has saved time, reduced errors and cut costs by replacing a centralized, batch-oriented order processing system with an interactive, distributed network of minicomputers.

When Bob Richard became Bird's director of management information services in 1972, the company used computers only for its corporate financial reporting. A detailed study of the company's division level order processing operations made it clear that computerization could help there, also.

"There was a huge amount of repetitious manual posting and writing going on," Richard explained. In addition, since all data processing was done centrally using data mailed in from the divisions, the computer-generated reports needed by division managers came out four to six weeks late.

He recommended against adding a larger corporate mainframe because "it would only have done what we were doing before, but faster." He also ruled out remote job entry from the division, "since it was only a perpetuation of batch" without the long-term operational benefits the company needed.

Best Solution

The best solution, Richard felt, was to establish satellite minicomputers in the divisions. The company launched the Bird and Son Information System (Basis) as the foundation of this integrated, interactive network of Digital Equipment Corp. minicomputers. A.S. Thomas, Inc., a consulting firm in nearby Westwood, Mass., configured the Basis hardware and played a major role in the development of the software. To date, three remote Basis sites are in operation, running on PDP-11/70 systems under the RSTS/E operating system. Two additional remote Basis systems are expected to be in place this year or early in 1982.

Each of these PDP-11/70 systems is linked through Decnet, DEC's X.25-based communications protocol, to another PDP-11/70 RSTS/E system at corporate headquarters. In the same corporate computer room, and linked with the other systems through Decnet, are a PDP-11/34 doing engineering computer-aided design/computer-aided manufacturing (CAD/CAM) working under DEC's RSX-11M operating system, a PDP-11/60 also running under RSX-11M and a VAX-11/780, which serves as the corporate administrative system.

By generating documents automatically that formerly had to be prepared manually, this new system has drastically reduced errors, made the documents more legible and greatly improved the processing of customer inquiries.

Sales correspondents, who handle about 80% of the company's contacts with customers, can now answer inquiries readily since they do not have to search out hard copy records first.

Other Benefits

Other benefits of Basis:

- In Bird's Shreveport, La., division a manual billing job that formerly took 10 hours is now completed by a PDP-11/70, as a background job, in two-and-a-half hours.
- "With Basis, both the divisions and headquarters work with standardized data rather than data formats determined by whoever first wrote down the information," Richard said.
- Price changes can be handled in minutes. Sales reporting no longer requires the manual computing and research needed before. And just as data entry is now standardized across the country's divisions, so is finished goods reporting.

The Bird & Son Computer Center

The divisions' PDP-11/70s run nearly unattended. There is a system coordinator at each division, but all programming and software maintenance are done at corporate headquarters, software additions/modifications are downloaded to each individual system through Decnet.

Corporate headquarters can investigate any bugs that arise on a division's computer system by remotely viewing an input transaction from a recovery system that is continually spun off to disk and then to magnetic tape at each division.

The security features built into Basis limit each user to a menu of options appropriate for his job. The system also includes a high degree of redundancy, explained Bob Thomas, the chief representative of the outside consulting firm that helped Bird & Son develop its new system.

"If the VAX system [used for corporate DP] were to go down when they were doing payroll," Thomas explained, "they could run payroll on the PDP-11/60, only not as fast."

Whenever the company updates the native-mode version of a Cobol program for the VAX-11/780, they also update the compatibility mode version that can run on the PDP-11/60, he added. Bird & Son uses an editor called "Assist+," purchased from Programation, Inc., that accepts only standard Cobol. This assures that the same programs can run on any processor in the Bird & Son network," Richard noted.

Mini Bits

Printer Works With IBM CPUs

ANNAPOLIS, Md. — Printer Systems Corp. has announced the Model 1800, a dual-mode printer system that is plug-compatible with IBM Series/1 or System/34 and System/38 processors.

The 1800 will print in draft quality mode at 200 char./sec with a 7 by 9 dot matrix. Correspondence quality printouts can be produced at 50 char./sec on a 40 by 18 dot matrix, the vendor said.

Units cost $2,695 and are available for Univac Corp., Burroughs Corp., Honeywell, Inc., Digital Equipment Corp. and Data General Corp. processors, the vendor said from Suite 100, 130 Holiday Court, Annapolis, Md. 21401.

Plotter Runs With Mini, Micro

AUSTIN, Texas — The Houston Instrument division of Bausch & Lomb Corp. has announced a 22-in. pen plotter, the CPS-30, which can be interfaced with almost any microcomputer, minicomputer or supermini.

Features include the ability to change or upgrade a computer system without having to replace plotters, a top speed of 400 in./sec and touch-type switches, the vendor said.

Units are priced from $6,400, the vendor said from One Houston Square, Austin, Texas 78756.

Mortgage Loan Turnkey Out

DALLAS — An entry-level hardware/software solution to mortgage loan documentation, based on the IBM Series/1, is available from Symbolics Financial Systems, Inc.

Based on the document preparation modules of the firm's Mortgage Loan Control System, the system is said to address the needs of 1982 Truth in Lending calculations and documentation preparation.

Hardware and software cost approximately $50,000 from the firm at 4580 Beltway Drive W., Dallas, Texas 75234.

Mannesmann Tally Cuts Costs

KENT, Wash. — Mannesmann Tally Corp. has announced price cuts and speed changes on its 1000 line of printers for minicomputers and personal computers.

The MT-1800 has been reduced from $2,495 to $1,995, the MT-1700 was cut from $1,995 to $1,695 and the MT-1600 was cut from $2,095 to $1,695.

In addition, the print speed on the MT-1000 series have been increased to 200 char./sec and the letter-quality mode on the MT-1800 has been cut to 50 char./sec after the firm added a 40 by 18 dot matrix to the unit. The company is at 8301 S. 180th St., Kent, Wash. 98031.

Printers Fit SEL 32 Series

MARGATE, Fla. — Data Engineering, Inc. has announced a family of line printers for Systems Engineering Laboratories' (SEL) 32 series processors.

Compatible with SEL's TLC channel via a DEI differential I/O interface, the printers are Control Data Corp. Fastran printers with 48-, 64- or 96 char. sets.

Model P4720, a 48-char. unit costs $57,000, the 64-char. unit (Model P4710) costs $58,000 and the 96-char. model (Model P4730) costs $59,000 from Suite 207, 2515 N. State Road 7, Margate, Fla. 33063.

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LSI-11s Get Ansi Link To Winchester Disks

SANTA ANA, Calif. — A single board controller is being offered by Emulex Corp. to provide Ansi standard interfacing of a variety of 8-in. Winchester disks to Digital Equipment Corp. LSI-11 series computers.

The SC04 controller meets the Ansi X3T9-1226 specification for connection of 8-in. Winchester disks and comes initially in two models for emulation of specific DEC subsystems. The SC04/A emulates the RP11E controller combined with multiple RP02 and RP03 disk drives to support all types of drives having capacities in the range of 8M- to 80M bytes.

The SC04/C emulates the RK611 controller combined with multiple RK06 and RK07 drives to support a range of fixed, removable and fixed/removable media drives having capabilities for which the RK06/07 provides a logical mapping onto the physical unit, the vendor said.

The SC04/A controller costs $2,340 and the SC04/C costs $2,650. OEM quantities are available from the firm at 2001 E. Deere Ave., Santa Ana, Calif. 92705.

National Semi Unveils 256K-Byte Card

SANTA CLARA, Calif. — National Semiconductor Corp. has introduced a 256K-byte "dual-wide" dynamic N-channel MOS random-access memory card that is mechanically and electrically compatible with the Digital Equipment Corp. Q-Bus series, the LSI-11, the LSI-11/23 system and the PDP-11/03 system.

The NS23M memory card will also operate with or in place of the DEC MSV11-D and the MSV11-E series semiconductor memory cards and can be installed in H9273-A or DDV11-B backplanes.

The NS23M is available at $1,020 per card for a 128K-byte depopulated version and $1,505 per card for the 256K-byte fully populated version, National Semi said from 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Model 8001 Micro Uses Intel Chips

DALLAS — Hardy Computer Corp. has announced the Model 8001, a processor based on Intel Corp.'s Multibus microprocessor and featuring Intel 8086 and 8087 chip sets.

The 8087 is a math processor and the 8086 offers math functions including transcendental functions. Other features include an Intel 8274 protocol controller, the ability to run Digital Research Corp.'s CPM/86 and CPM/80 operating systems and up to 128K bytes of main memory.

Processors cost between $5,000 and $7,000, the vendor said from 11430 Denton Drive, Dallas, Texas 75229.

Minis Use Winchesters, Streaming Tape

COSTA MESA, Calif. — Microtech Business Systems, Inc. has introduced a family of minicomputers built around Winchester disk drives and featuring streaming tape backup.

Available in seven basic configurations, each member of the family includes a high-speed, 16-bit minicomputer and 64K bytes of random-access memory on a single board. All models support a variety of hard disks, from 10M bytes on a single spindle to as much as 73M bytes on four spindles, according to the firm.

The systems run under Point 4 Data Corp.'s Iris operating system.

Software available includes word processing, accounting packages and a variety of medical, dental, legal and architectural programs. All packages include customization and at least eight hours of in-house training, Microtech said.

The smallest system in the family, the System 50, starts at $14,950; the top of the line, System 400, costs $36,000. Mid-level systems vary in price depending on memory configurations and other options.

Microtech is at 3180 Pullman St., Costa Mesa, Calif. 92626.

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CW1012

DBMS Hoax?

DEC-computer sites purchase bogus relational system.

Fortune-500 companies did it. So did prestigious universities, banks, newspapers, a large computer manufacturer, and many others. All of them bought a software package that they believed was a relational DBMS. Why this happened is a lesson in the history and perception of relational systems.

IBM AGAIN

Relational systems were conceived in 1970 by E. F. Codd, an IBM research scientist. The advantages of data management software had been known for years. But Codd invented a concept of looking at data and information in a simple but powerful way.

Codd discovered that all data could be organized into tables, or flat files, in a normalized form. He called these tables relations. Around this framework, he invented an easy-to-use language to manipulate and extract data from relations. Codd's conceptual breakthrough accommodated all data structures that conventional DBMS's did. And he discovered that inexperienced people could understand his concepts as easily as software experts.

THE FLAW

Codd's scheme required an operation called JOIN. This facility dynamically merged related data items from several tables into one logical table whose characteristics were identical to those of a physical table. But here he encountered a major problem.

The JOIN operation was impossible to implement efficiently with then-current software methods. An efficient, run-time JOIN required special hardware called a content-addressable memory. Such hardware would take years to develop. In fact, commercially-available content-addressable memory still does not exist.

In 1971, our company, Software House, began developing a relational DBMS for large DEC computers. We believed that our System 1022 DBMS would overcome hardware constraints with clever software techniques. It was a bold gamble.

After five years of development, Software House had failed. At that time, System 1022 had many relational features. According to Codd's definitions, however, System 1022 was not relational. Nevertheless, our president believed that System 1022's few relational flaws would be masked by its many relational features. He decided to market it.

NO JOIN OPERATOR

For interactive users, System 1022 provides a flexible and easy-to-use language for on-line data-base queries and updates. Boolean queries with multi-key and partial-key searches happen in seconds, regardless of data-base size or query complexity. The secret is System 1022's proprietary, inverted-file indexing and access method. And during data base updates, System 1022 automatically and efficiently maintains its data-base indexes in optimal form, without degrading subsequent retrieval speed. So you don't have to periodically rebuild your data-base indexes or spool your data-base updates—major flaws in other DBMS's.

System 1022's access method takes the place of content-addressable memory. It may not be as fast as the hardware, but when you see it in operation you'll agree that it's more than fast enough. However, no explicit JOIN operation exists. Instead, a powerful MAP command quickly retrieves related information from various tables. But more on that later.

NO PASCAL

With System 1022's Host Language Interface, you can produce tailored data base application environments in COBOL, FORTRAN, MACRO, and BASIC. So you can exploit operating-system features like command scanning, IPCF, and DECNET in your applications. You can even write your own interfaces to other software packages and other host languages.

System 1022's Host Language Interface was not designed as an afterthought. All of the features of System 1022's interactive environment are also available in the Host Language Interface. For example, a simple subroutine call invokes the 1022 Report Writer and then returns to the host-language program at its next statement.

RECURSION

Some DBMS's support only sequential or two-level hierarchical data structures. This severely limits the variety and sophistication of your applications. A comprehensive data base system does more.

System 1022 supports full hierarchical, network, and recursive data structures, for virtually any application. Its relational approach combined with this inverted-file access method offers high performance, high reliability, and data integrity. System 1022 handles a complicated bill-of-materials application as easily and efficiently as a simple mailing list application.

System 1022 also gives you both data independence and structure independence. As your requirements evolve and change, you can add new fields, new record types, and new relationships to your data base, and not have to recompile or relink your programs that access the data base. But that's not all.

With System 1022's efficient MAP facility, you can navigate your data structures from the interactive environment as easily as from your host-language programs. Of course, in both environments, you can access and update several record types and several data bases at once, even from many processes simultaneously.

APPLICATION PROBLEMS

System 1022 is more than just a DBMS. There's a report writer with pretotaling, text scrolling, context independence, and unlimited control breaks; audit trail journals for restart and recovery; field-level security based on user ID, class, and passwords; direct access to your existing COBOL files; utilities to load your data base, add fields, extract subsets, perform complex statistical analysis, post transactions; and much more.

For most jobs, you don't even need to write a program—System 1022 already provides the utilities. And you can easily teach your users to do their own development, reporting, and data maintenance. So you can centralize or distribute your information management as much as your needs require.

UNUSUAL QUALITY CONTROL AND SERVICE

The other side of software features is software service. Unlike other software companies, we take software bugs for what they really are—software mistakes. And we've spent man-years developing proprietary, automated software testing tools to eliminate such mistakes. We put each version of System 1022 through a comprehensive, 15-hour computerized check-out on our in-house computer. Only after it passes this checkout with a perfect score is it released to our field-test sites. And only after a successful field-test is System 1022 released to you. System 1022's reliability is well above the industry average.

Despite our best efforts, some mistakes elude us, so we take them seriously if you discover them. We realized long ago that a System 1022 software mistake can shut down a critical application in your shop, costing you both money and angry users. If you discover and report a critical mistake that we've made, our maintenance and support staff promptly investigates it for you. Then they provide you a way to conveniently get around the mistake or they correct it for you with a patch on your own computer.

In addition, you don't have to send us a mistake-report-form. Our support and maintenance staff is as close to you as your telephone and your computer.

PROFIT MOTIVES

DBMS software is not cheap. You can pay from $5,000 to over $100,000 and buy a wide range of capability and functionality, so careful shopping is necessary. System 1022, with all its separately-priced modules, costs only $54,000—and substantially less for the smaller DEC-2020 computer. For this price, you receive a perpetual license with one year of our maintenance and update service. Convenient lease and rental terms are available, as well as generous discounts for tax-exempt institutions.

Our price is only a fraction of what it costs us to develop and enhance System 1022. And it's only a fraction of what it would cost you to develop and support comparable software yourself.

But best of all, you can make a profit from System 1022. You might do what the time-sharing director of a large insurance company did. With System 1022, he increased his staff's efficiency by "5 to 10 times over conventional methods of application development." Or the head of the management-consulting division of an engineering company. His division "can now handle far more projects with fewer people." Or because of System 1022, you might not need to hire two more good programmers—or one more bad one—this year.

Each of our customers—large and small—has a unique System 1022 profit story to tell. One of them is probably in a computing environment just like yours.

STANDARDS

System 1022 is now the information management standard for large DEC computers. Hundreds of organizations—in the U.S. and around the world—use it on DECsystem-10 and DECSYSTEM-20 computers. No other DEC-10/20 DBMS is as widely used as System 1022.

Naturally, such a large user base gives you many benefits. It ensures that we'll be around to support and enhance System 1022 long after DEC discontinues its 36-bit computer line. And it provides plenty of System 1022 application ideas and experience for you to tap, either through our user newsletter The Audit Trail or by direct contact with users at our annual Users Conferences. In addition, other software vendors now interface their products to System 1022. This gives you a variety of complementary and compatible software to choose from as your needs grow.

PRESIDENT ALSO INVOLVED

Our president is an honest man. When he decided to market System 1022 back in 1976, he knew it was not a relational DBMS. So he told his salesmen not to call it relational.

Despite our relational disclaimers over the years, our users have discovered that System 1022 effectively helps them manage their information. They use and rely on its many relational features so much that they believe System 1022 is a relational DBMS, even though it strictly isn't.

Our president and his salesmen are still honest. Furthermore, they all have years of hands-on experience with systems programming and application development, so they don't have to confuse you with sales jargon or high-pressure sales techniques. You should feel free to call on them for help. After all, as any programmer will confirm, it's almost impossible for one programmer to tell a lie to another and get away with it.

THE ULTIMATE PROOF

The best proof of System 1022's value to you is how it works at your own site, with your own information and users. That's why we offer you a free 60-day trial and on-site technical seminar.

During the free seminar, you learn about the System 1022 features that we don't have the space to discuss here. You can ask some tough questions and receive knowledgeable, accurate answers.

During your free trial period, you can verify how easy System 1022 is to install. Read our clear, literate documentation and test our hot-line support service. Compare and benchmark System 1022 against other systems—relational or not—that cost half as much or twice as much. Take some of your largest data files and let System 1022 prove how quickly and easily you can build applications around them. And watch your programmers—and your end-users—learn to use System 1022 productively in a matter of hours, without having to attend special training classes. You'll be very pleasantly surprised.

If you have a DEC-20 or DEC-10 computer, we urge you to call Lynda Jones at the number below to arrange your free trial and on-site seminar. Call your DEC salesman, too. If he doesn't already know about System 1022, he should.

Some of you may think that our claims and our offer sound too good to be true. Or you are already using other software that you bought or developed without investigating System 1022 in depth. Some of our customers have been in exactly those predicaments, but they called us and now have some of the most successful computer shops around.

So don't delay. Enjoy the productivity improvement and user satisfaction that System 1022 provides. Give us a call today with no obligation.

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To Extend Value-Added Services

Geisco Acquires Three Software Firms

By Marcia Blumenthal
CW Staff

NEW YORK — In a continuing effort to extend the range of its value-added services to users, General Electric Information Services Co. (Geisco) early this month announced it has acquired three privately held software companies.

The largest and most well known of the acquired companies is Software International Corp. (SI) of Andover, Mass., which for its fiscal year ended Sept. 30 had revenues of about $24 million, according to company President William Watson. The other two Geisco acquisitions are Energy Enterprises, Inc. of Denver and Banking Systems, Inc. of Dallas.

Based upon the firms' financial performance during the next three years, Geisco will pay a total of between $35 million and $68 million in cash for the acquisitions.

Energy Enterprises will be fully merged into Geisco while the other two firms will operate as wholly owned subsidiaries, according to Gregory J. Liemandt, president and chairman of the board of Geisco, a unit of General Electric Co. The management of the acquired firms will remain intact.

The SI acquisition will cost about $25 million to $50 million, Liemandt said. Combined revenues for the three firms is about $50 million.

Acquisition Proposals

Liemandt said Geisco approached each of the three companies with acquisition proposals. Although he would not elaborate on the pace or scope of Geisco's acquisition strategy, the new acquisitions put the value of Geisco's information processing acquisitions at some $90 million. He said acquisition prospects include both large and small firms.

In January, the firm acquired Lamda Technology, Inc. for about $26 million. In 1979 it acquired Mitrol, Inc., a supplier of Mims manufacturing software, which this week for the first time will be licensed to users who are not subscribers to Geisco's time-sharing services.

The acquisition of SI provides Geisco an entry into the accounting systems market, which is projected to grow from $130 million this year to close to $500 million by 1986, Liemandt said. SI currently has a 15% share of the packaged accounting applications market, he claimed.

(Continued on Page 106)

Altergo, Insac Call It Quits, Terminate Marketing Pact

By Marcia Blumenthal
CW Staff

BOSTON — After a year and a half of marriage, Altergo Software, Inc. and Insac Software, Inc. have called it quits.

Insac Software and Altergo Software Ltd., the UK-based parent of the firm that Insac acquired in March of 1980, have terminated the arrangement under which a newly formed U.S. subsidiary, Altergo Products, Inc., has sole marketing rights for the Altergo-developed product line. These products include the Shadow II teleprocessing monitor and Quota II on-line programming system.

While the two companies have yet to agree on the financial terms of the termination settlement, Altergo Products will maintain the more than 200 user base of the products; there will be no disruption of service for users, both companies said.

Insac will continue to market and support in North America two other Altergo products, Guts and CPG.

Insac's Reason

Although Altergo would not discuss the events surrounding the dissolution of the relationship between the two firms, Joseph Ganem, president of Insac Software, said his firm decided to specialize in application development products rather than continue to market teleprocessing monitors.

The decision to specialize in productivity tools was made about six months after the acquisition, Ganem said. Once a marketing-oriented company decides to go in a certain direction, it does not make sense to keep sustaining some products, he explained.

Ganem said his firm is in the process of acquiring new products and should be making some announcements in November.

The reason Insac acquired Altergo in the first place was because the parent firm preferred to concentrate its marketing effort in Europe rather than in the U.S., Ganem claimed [CW, May 18].

Apparently, Altergo has now renewed its commitment to the U.S. market. Heading up the new company is David Brownlee, who relocated to the Boston-based firm from the UK. Altergo said it is installing

(Continued on Page 106)

Chinese Call for U.S./PRC Joint Ventures

By Robert Batt
CW West Coast Bureau

NEWPORT BEACH, Calif. — Joint ventures are going to be the most effective way to penetrate the Chinese computer market, a group of businessmen and consultants was told here recently.

On a two-week whirlwind tour of the U.S., a visiting Chinese delegation emphasized the need for cooperative partnerships as a way of overcoming China's lack of foreign currency.

Speaking at an informal gathering of data processing vendors and industry analysts, Zhang Changping, director of the Information Research Institute at the Fourth Ministry of Machine Building, claimed China was looking for increased cooperation with U.S. computer vendors. The Fourth Ministry is the government agency in China responsible for all foreign purchases of computer and electronic equipment.

"In the past, foreign manufacturers sold products to China but were unable to provide adequate maintenance and service," Zhang, who is also chairman of *China Computerworld* — a joint venture between the Fourth Ministry and CW Communications, Inc. — told his audience. "Now big companies are setting up service centers with the help of Chinese partners and we believe that those who want to do the most business in China will have to find a partner for their products."

Because of the lack of foreign exchange, Zhang said, the Chinese government is looking for package deals in which U.S. companies would get distribution outlets rather than cash. This is already beginning to happen with companies like Hewlett-Packard Co. supplying components and technical expertise in return for Chinese personnel.

In China two agencies — the Information Research Institute and the Chinese Electronic Technology Import and Export Corp. — act as the major purchasing agents for overseas DP equipment.

The delegation, which also included Chen Mingkun and Tang Baoxing, general manager and news editor, respectively, of *China Computerworld*, emphasized the importance of U.S. technological expertise to the continued industrial modernization of China. With 40% of DP applications going into the scientific field, 30% into manufacturing and process control and 30% into business and commerce, the delegation claimed the best strategy for U.S. companies is to introduce their latest technology into China.

The visitors warned that other countries, particularly Japan, France and West Germany, are anxious to do business. "The Japanese have very well-developed research and development capabilities," Chen said. "They push their products very

(Continued on Page 108)

Ireland Seeks to Lure Software Firms to Emerald Isle

NEW YORK — The Industrial Development Authority of Ireland has fostered the location of U.S. manufacturing plants in that country through elaborate financial incentives. Now the authority has established a program to lure software and services firms to the Emerald Isle.

At the heart of the new incentive program are direct cash grants to firm's creating software and service jobs in Ireland. Until now, existing financial incentives were tied to capital asset investment levels, according to Jerry J. Kelly, manager of the Irish development authority's service industry program.

Depending upon the quality of the job offered and the nature of the training involved, the authority will pay up to $10,000 for each service job created. The cash grant is a one-time payment, but the authority will also provide service firms with grants for computer equipment, furnishings and training, Kelly said.

Besides the cash grant, the development authority said American service firms would be attracted to the program because of Ireland's maximum corporate tax rate of 10%.

General Instrument Invests $6 Million in Sytek Corp.

NEW YORK — The completion of the initial phase of a $6 million investment in Sytek Corp., a privately held communications company based in Sunnyvale, Calif., was announced here by General Instrument Corp.

The affiliation of the two companies reportedly creates a vertically integrated data communications networking capability by combining General Instruments' broadband CATV resources, offshore manufacturing facilities and service organization with Sytek's data communications expertise and broadband data networking products.

General Instrument also announced plans to increase its investment in subsequent phases of its financing program to provide required capital to finance anticipated Sytek growth.

The firm's field service organization reportedly will provide services to the local-area network customers of Sytek.

Sytek designs, manufactures and markets broadband-based networking systems and data communications products including modems, multiplexers and data concentrators.

Through its Jerrold Division, General Instrument claims to be the leading supplier of electronics to the cable TV industry. The company reported total revenues of more than $825 million in the fiscal year ended Feb. 28, with broadband communications revenues amounting to more than $300 million.

Mergers & Acquisitions

The merger of **Spectrum Specialities, Inc.** into a wholly owned subsidiary of **Wavetek Data Communications, Inc.** has been completed.

Shell Canada Ltd., through its New Ventures Group in Toronto, has purchased a majority interest in its affiliate **Artelonics Corp.**

Control Data Corp. has agreed to transfer its shares of **Elbit Computers Ltd.** to **Elron Electronics Industries**, Haifa, Israel, in exchange for 546,369 common shares of Elron.

Tymshare, Inc. has purchased the operating assets of **ITT Electronic Travel Services, Inc.**, a former subsidiary of ITT.

Anacomp, Inc. and **DSI Corp.** have executed a definitive agreement providing for the merger of DSI into a wholly owned subsidiary of Anacomp, based on a tax-free exchange of common stock.

A letter of intent calling for the acquisition of **Management Control Systems, Inc.** by **Informatics, Inc.** has been signed.

CPT Corp. has acquired **General Business Systems**, a division of **Shasta General Systems, Inc.** in Los Angeles.

Nickels & Dimes

The board of directors at **Cullinane Database Systems, Inc.** has declared a two-for-one stock split payable on Oct. 26 to shareholders of record on Oct. 1.

$$$

The board of directors of **NCR Corp.** has authorized the company to purchase up to one million shares of NCR common stock.

The stock will be used primarily for company purposes, specifically for use in the company's employee stock purchase plan, and in the conversion of its convertible securities into common stock.

$$$

Transducer Systems, Inc. has declared a quarterly cash dividend on two cents per share on its common stock payable Oct. 16 to shareholders as of Sept. 30.

$$$

M/A-COM, Inc. has voted to continue the quarterly dividend of three cents per share, with the next dividend to be paid on Oct. 26 to stockholders of record on Oct. 2.

$$$

General Instrument Corp. has completed an initial phase of a $6 million investment in Sytek, Inc., a privately held data communications outfit in Sunnyvale, Calif.

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National Account Program

Apple Targets Large Business in Market Push

By Robert Batt
CW West Coast Bureau

CUPERTINO, Calif. — A marketing drive to increase its penetration of the large business market is being launched by Apple Computer, Inc.

The personal computer giant is setting up an Apple National Account Program with certain of its specialist dealers directing their efforts at winning orders from large corporations. The program follows the recent announcement by its arch rival, Radio Shack Corp., that it is assembling national accounts sales force to call on major companies.

The Apple program "is a coordinated effort between existing Apple dealers and management designed for the business markets. We are aiming at the Fortune 1300 companies and our systems will be geared in particular to any large corporation or institution with multiple locations," John Holmberg, manager of business sales development, said.

Under the program, Apple aims to provide pre- and postsales coordination with its customers. A network of dealers — around 150 — will be certified to provide large corporations with sales, service and user training.

The dealers, who will be selling Apple II and Apple III computers, will be selected on their ability to sell outside of the retail environment, for which most Apple dealers are noted, and their ability to provide on-site services.

Recently, there has been speculation that Apple's relationship with some of its dealers has been less than smooth since the company began selling some of its products directly to school districts. Some industry pundits see the new program as an attempt to reassure the dealer network. A.C. "Mike" Markkula, Apple chief executive, recently stated, "The most important ingredient for success is strong relations with dealers."

There is no doubt that the market for personal computers is huge with one market research firm forecasting annual sales to reach $4 billion by 1985, of which $2.4 billion would be in business applications.

Under the new marketing program, Apple, like its competitors Radio Shack and IBM, will be offering price reductions of between 5% and 15% in return for a customer commitment to buy a set number of Apple computers for a one-year period. The company will also install the equipment in multiple locations via its dealer network, if this is required by the user.

Although the personal computers can be used in a distributed data processing environment to link up with more powerful mainframes, Apple sees them being used more as desktop stand-alone equipment. Potential applications include financial modeling; decision support services, such as budget and word processing; graphics and data base management.

"For many middle and top managers, this will be the first time they have ever come into contact with a keyboard and so our selected dealers will provide ongoing training in all facets of Apple computers," John Butler, national account development manager, said.

Both the Apple II, retailing at around $3,000 including peripherals, and the Apple III, priced at $4,000 to $6,000, have hundreds of software packages capable of running on them. Apple intends to make this software also available via its dealerships to cater to different business applications.

The announcement by Apple comes at a time when competition in the personal computer field is heating up with new entrants like IBM and Xerox Corp. doing battle alongside the more established vendors.

Currently, Apple and Radio Shack head the field with about 20% of the market apiece. Apple has enjoyed rapid growth over the last few years, boosting its sales from $8 million in 1978 to a projected $340 million in the year that ended Sept. 30. Profits for the last financial year are anticipated at around $40 million compared with $800,000 in 1978.

Service Covers Telecommunications

CAMBRIDGE, Mass. — Arthur D. Little Inc.'s Decision Resources has launched the World Telecommunications Information Program (WTIP) subscription service.

Started in response to client interest in an equipment market projected to reach $88 billion by 1990, the service is founded on data assembled and analyzed for three world telecommunications studies that treated the years 1970-1980.

Along with historical and current data, WTIP can provide short- and long-term market projections. Its 10-year forecast time frame will be updated frequently. The data base is divided into six geographic regions and six categories.

Besides the data base, subscribers will receive reports, consulting privileges and meeting schedules. The subscription fee for the full program is $30,000. Arthur D. Little is at Acorn Park, Cambridge, Mass. 02140.

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New Companies

Alphatel Corp. is a telecommunications company that recently opened at 301 Maple Ave., W. Tower, Fourth Floor, Vienna, Va. 22180.

Xyplex, Inc., a manufacturer of data communications products, was incorporated recently at Oak Hill Road, Harvard, Mass. 01451.

A group of former Control Data Corp. employees has formed **Gateway Communications, Inc.**, a high-technology venture that can be reached through P.O. Box 19128, Irvine, Calif. 92713.

The Arbee Corp. has formed a new subsidiary called **Arbee Computer Systems, Inc.** located at 311 W. Stiegel St., Manheim, Pa. 17545.

Robert J. Hill, former president of Safeguard Business Systems, Inc., has announced the formation of **Morley-Hill, Inc.** with New Jersey businessman Peter Morley. The firm works in the acquisition and subsequent management of other businesses and is based at 200 Office Center Building, 275 Commerce Drive, Fort Washington, Pa. 19034.

Keyword Associates, Inc., a newly established marketing communications and documentation services company plans to target small to midsize businesses that need a variety of communications ranging from user documentation to basic product publicity. The company can be reached through P.O. Box 177, Concord, Mass. 01742.

Geisco Acquires Firms

(Continued from Page 103)

SI also has a unit specializing in manufacturing software, but this product line will not conflict with Mims because it is aimed at users in companies with revenues of between $2 million and $5 million, while Mims is targeted at significantly larger firms.

Unlike many independent software companies that recently went public, SI chose to be acquired, according to Watson, because an affiliation with Geisco offered greater market opportunity because of Geisco's computer network and mammoth distribution capabilities.

The two firms have been negotiating the acquisition for three months. Watson said that five other companies were interested in acquiring SI, but no bidding war occurred.

The acquisition of Banking Systems provides Geisco a better position in the retail and wholesale banking applications software and banking system design and consulting capabilities.

With its production/exploration software and data bases, Energy Enterprises will improve Geisco's presence in the petroleum services market.

This year Geisco's revenue will reach about $500 million, of which more than 70% will come from value-added services, Liemandt said.

Altergo, Insac End Pact

(Continued from Page 103)

Shadow II at a rate of more than 15 per month and has made some enhancements to the products, which will be available to U.S. users during the last quarter of the year.

These include an on-line friendly query system for IBM DOS/VSE and OS/VS users; Spoolout, which allows print output held on a Power/VS or VSE/Power spool file to be output through Shadow II to a terminal printer; Textpower, a multiple-use text processing feature; and Spot, an on-line system display feature.

Moreover, Altergo Products said it would launch its Aros data base management system, which runs in combination with either Shadow II or IBM's CICS/VS, in the U.S. during the first quarter of 1982. The firm will put the system in beta test at Shadow II user sites by the end of the year.

The Aros system is suitable for IBM 4331 users to large MVS users. The largest current Aros system is used on an IBM 3033 under MVS and supports 1,700 local and remote 3270-type terminals concurrently.

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Members of Chinese Delegation Call for Joint Ventures With U.S.

(Continued from Page 103)

hard in China. For example, in 1979 Hitachi [Ltd.] installed just nine computers in China. In 1981 this figure rose to 55 installations."

Again, China is looking for joint licensing agreements to take advantage of new technology. Such an agreement recently was signed between the Fourth Ministry and the French electronics giant Thomson CSF in which the French sold the design of floppy disks and printers to China.

The delegation added that China is anxious to develop joint computer manufacturing ventures with overseas vendors in which equipment would be manufactured on Chinese soil and both the Chinese and the overseas manufacturer would share the profits from worldwide distribution.

Technology Transfer

Reflecting perhaps the great shift that has taken place in China since the death of Mao Tse Tung, the Chinese government said the visiting trio would have no political objection to such an arrangement. However, ultimately the transfer of technology is the thing most needed.

"U.S. semiconductor technology, for example, can be used to help transfer technological exertise," Chen noted. "We are not looking to buy huge quantities of chips, however, since we can already make 16K ROMs [read-only memory]. ".

At the moment China manufactures two semiconductor devices — the 50 Series, similar to Intel Corp.'s 8080, and the 60 Series, similar to Motorola Inc.'s 68000 chip.

Currently China employs 40,000 people in the computer industry. Eighty factories throughout the country are devoted to DP production and there are between 3,600 and 3,800 computer installations.

Overseas manufacturers make up 11% of the market, which is spread between 10 countries. The U.S. is the leader with a 37% share followed by Japan with 31%.

In the last three years, China has imported more than 5,000 microcomputers because of their high-performance/low cost potential. The delegation claimed that by 1990 the number of computer installations in the country will top 40,000.

To give an idea of the priority placed on the computer industry, Chen said that of the $200 million allocated to China by the World Bank for use in universities, around half of this would be used to buy technological equipment for teaching purposes.

AEA Forms Education Group

SANTA CLARA, Calif. — The American Electronics Association (AEA) has voted to establish an engineering foundation for the furtherance of engineering education in the U.S. on Sept. 16.

The board of directors is also requesting that all member companies contribute a dollar amount equivalent to 2% of their research and development budgets to the support of engineering education. Many member companies are already providing support for engineering education. It is thought that the 2% goal could provide as much as an additional $30 million- to $50 million per year.

In addition to the contribution by member companies, AEA will contribute $50,000 immediately from its operating revenues to help launch the new foundation. It will then contribute 2% of annual member dues received each year thereafter.

Comprised of representatives of more than 1,500 companies, the AEA is based at 2600 El Camino Real, Palo Alto, Calif. 94306.

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Supermini Makers Beware

Firm Dares Industry Giants With 32-Bit Micro

By Tim Scannell
CW Staff

NATICK, Mass. — Like a lot of young and fast-growing high technology companies, Charles River Data Systems, Inc. (CRDS) got its start by hopping on the electronic coattails of a larger, more established computer firm.

Since about 1973, CRDS — a supplier of memory systems and floppy disk drives for Digital Equipment Corp.'s PDP line of processors — has managed to prosper and grow in DEC's shadow, doubling its sales and increasing its technological prestige along the way.

However, rather than sit back and be satisified with its steady growth and comfortable product niche, CRDS last month unveiled an inexpensive 32-bit microcomputer-based system that not only slices through traditional 16-bit ranks, but also threatens to give 32-bit superminis a run for their user's money [CW, Sept. 28].

Accidental Start

To understand CRDS' feisty business philosophy, one must consider the firm's beginnings and the philosophy of its president and founder, Richard B. Shapiro. Unlike most computer companies, CRDS got its start almost by accident.

As a student at nontechnical Brandeis University in Waltham, Mass., Shapiro, a physics major, familiarized himself with computers by frequently using the university's DEC PDP-15 in physics experiments. The mini was so popular that Brandeis one day decided it might be worthwhile to expand the system's memory to handle the increased workloads.

Inexpensive Solution

Turning to its own undergraduate talent, the university asked the people who used the system to come up with an inexpensive solution. Shapiro's only exposure to high-technology was as a hobby and as an amateur radio operator, but he sat down and mapped out a scheme that would increase the PDP-15's memory.

As a vote of academic confidence, Brandeis paid Shapiro $2.25 an hour for his developmental efforts.

Having conquered the PDP-15's problem, Shapiro expanded the memory on the university's PDP-10. In 1973, he "went corporate" by renting a small storefront in downtown Waltham for $90/mo, hiring a part-time secretary and expanding the memory of DEC computers at other universities.

As the projects got more demanding, the staff of the fledgling CRDS graduated from tinkering and began buying bare bones equipment. For instance, it purchased core boards from nearby Cambridge Memories, Inc. (now Cambex).

CW Photo by T. Scannell

Richard Shapiro at the Press Conference Heralding the Release of Charles River Data Systems' "Supermicro."

About 1976, the firm expanded its business to include DEC-compatible disk controllers, which proved to be a more substantial market, and eventually began manufacturing floppy and Winchester disk drives.

Although CRDS is basically in the same business it was in eight years ago in that small Waltham storefront — selling DEC-compatible memory and storage alternatives — the firm now has about 50 employees; its sales totaled $5.65 million as of the middle of this year. The firm took the poten-

(Continued on Page 110)

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Computerworld/UK then contacted every one of those 8,000 identified companies, and spoke to the person in charge of the computer system. They established that person's actual title and located the key decision makers of the company. In this way, they spoke with the vast majority of the most influential people in the business. And with this list of names, *Computerworld/UK* feels they have achieved the perfectly conceived profile.

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Orders & Installations

The Electronic Financial Services Division of Automatic Data Processing, Inc. has been selected as automated teller machine vendor for the California Credit Union, which has ordered 60 of the machines.

Docutel Corp. has been awarded a contract for 100 new Total Teller Series 2300 automated teller machines by Maryland National Bank.

Electronic Data Systems Corp. has signed an eight-year $6.3 million contract with Security Mutual Life Insurance Co. of New York to assume full DP responsibilities and the installation of its new Life Management Systems 1.

RCA American Communications, Inc. has announced a $180 million agreement with Alascom, Inc., the long-lines carrier for Alaska, for satellite communications services through June 1991.

Anacomp, Inc. has made an agreement with the Cessna Aircraft Co. to provide micrographics services to Cessna's worldwide dealer network.

Pacesetter Financial Corp. has signed a contract with Systematics, Inc. for a facilities management program to provide centralized data processing services to Pacesetter and its 10 affiliate banks.

Cray Research, Inc. has made an agreement with Technology Development of California under which a Cray-1S/1300 computer system will be installed at Nasa-Ames Research Center.

Cray Research, Inc. has received an order from the Lawrence Livermore National Laboratory Computing Center in California for a new computer system. The contract is valued at more than $24 million.

Duke University in Durham, N.C., has ordered the Duet system from Software Sciences, Inc. for point-of-sale inventory management in the college bookstore.

ITT Courier Terminal Systems, Inc. has received a $200,00 order from Gibraltar Steel Corp. for its systems network architecture controllers and associated equipment.

Systematics, Inc. will provide data processing services to Nashville Citybank and Trust Co. over the next five years under the terms of a recently signed multimillion dollar contract.

M/A-Com, Inc. announced that one of its operating subsidiaries, Digital Communications Corp., has been awarded contracts to supply satellite communications equipment to AT&T long lines.

FirmChallenges Industry Giants

(Continued from Page 109)

ial risky step into full-system computer manufacturing for two reasons:

- Although CRDS might continue to chug along, it felt it would not develop and grow if it kept its destiny in another manufacturer's control — even if that company was DEC.
- About three years ago, trends in computer technology — most notably the introduction of high-speed semiconductors like Motorola's M68000, which is used in the firm's new 32-bit machine — made it financially and developmentally attractive to make the systems jump.

According to the energetic Shapiro, the introduction of his Universe 68 computer comes at a key time in the industry. While there are a lot of large-scale 32-bit minicomputers on the market, all of them are aimed at mainframes; only recently have some been downgraded to attack the high-end 16-bit systems.

And while some microcomputers have beefed up their technology by incorporating 16-bit chips, all of them are targeted at the lower end minicomputer spectrum.

CRDS, on the other hand, intends to "slice through" the middle of the well-established 16-bit territory, offering a 32-bit alternative for the same amount of money. In fact, the Universe 68 — which incorporates a Unix-like operating system and expanded I/O bus — is aimed directly at DEC computers.

At the moment, DEC is reportedly caught up in a marketing Catch-22 — it cannot come out with a low-end 32-bit system to counter CRDS' and other vendors' attacks because it would compete against its own large PDP user base. It is Shapiro's philosophy — and, he believes, his destiny — to take full advantage of that situation.

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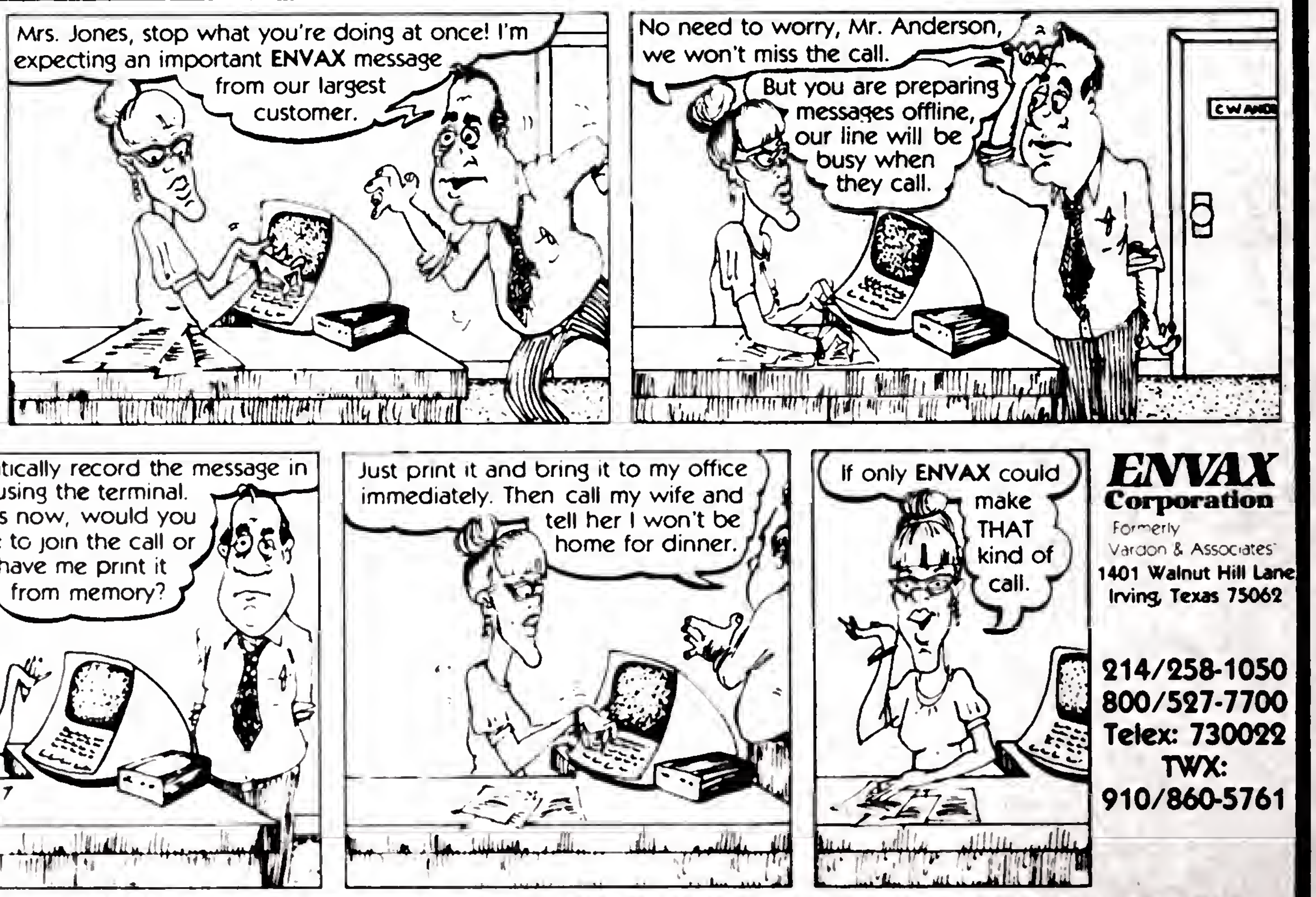
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Executive Corner

- Robert E. Cook has joined VM Software, Inc. as president and chief executive officer.
- Gary E. Liebl has been promoted to president of Microdata Corp. by the board of directors.
- At Genrad, Inc., Steven J. Stadler has been named to the newly created post of senior vice-president, strategic analysis, and W. Douglas Hajjar has been appointed senior vice-president and chief financial officer.
- Francis J. Gaudette has been elected vice-president of finance at C3, Inc.
- R.V. Weatherford Co. has promoted three key managers recently: Dennis Vlasich has been named vice-president, Digital Systems Division; Bob Allard becomes corporate controller; and Bruce Blankfield has been named director of operations at that company.
- Compuserve, Inc. has also announced three promotions at its Columbus, Ohio, headquarters. Alexander B. Trevor was named executive vice-president of the Comlink network services business; William G. DuVall was named vice-president of network operations; and John E. Meier was elevated to the position of vice-president and general manager of the Information Service Division.
- James T. Halom has been promoted to senior vice-president and treasurer at Control Data Corp.
- Micro Five Corp. has announced the appointment of Roberto Maldonado as vice-president of international marketing.
- Richard L. Richmond has been named senior vice-president and general manager of domestic communications at Telcom, Inc.
- Dr. An Wang, chairman and president of Wang Laboratories, Inc., recently announced the promotion of 10 new vice-presidents at his company: Dr. Albert P. Belle Isle, Ray Cullen, Michael P. Downes, Martin Goldman, Louis B. Green, David J. Hennessey, Herbert Holzman, Bruce A. Hurwitz, John F. Raffo and Paul W. Sandman.
- George Gazerwitz has been appointed vice-president, manufacturing, on the corporate engineering and manufacturing staff at Burroughs Corp. Also at Burroughs, John W. Perry has been named vice-president of marketing strategic planning.
- Frank Cancro has recently joined Personnel Data Systems, Inc. as vice-president of marketing.
- James E. Starnes was elected president and chief executive officer at Graphics Technology Corp.
- Conrac Corp. has named Ronald A. Abelman president of the company's Conrac Division.
- Memorex Corp. has appointed Wade F. Meyercord vice-president and general manager of its rigid media and components division.
- Frank Arentowicz Jr., J.D. has been placed in the recently created spot of vice-president, marketing, for the legal information services operation at Informatics, Inc.
- Richard Davis Barber has been elected to the board of directors and voted executive vice-president of Government Counseling Ltd.
- Philip P. Colligan has been named vice-president of the Northeast regional operations of Analysts International Corp.
- Frank E. Hanou has been named vice-president of marketing at Computer Entry Systems Corp. of Silver Spring, Md.
- Hudson G. Boue has been appointed vice-president and treasurer of Memorex Finance Co., a division of the Memorex Corp.
- Joseph Reymann has been named vice-president of operations at Forth, Inc. in Hermosa Beach, Calif.
- Comsat General Telesystems has appointed Victor Schendeler to the position of vice-president, manufacturing operations.
- Michael B. Chamberlain has been promoted to senior vice-president in charge of field operations for the Sorbus Service Division of Management Assistance, Inc.
- NBI, Inc. has announed that Chuck L. Dumas has joined the company as vice-president of manufacturing.
- Ben T. Taniguchi has been named vice-president of marketing for San Jose, Calif., based Priam Co.
- Jimmy Duckworth has been appointed president of Memorex-DIC, a joint venture company of Memorex Corp. and Dainippon Ink and Chemicals.
- James E. Thornton has been named to the newly created position of chairman and Lyle D. Altman to the post of president at Network Systems Corp.
- Mel Snyder has been appointed vice-president of marketing and sales at Televideo Systems, Inc.'s video display terminal division.
- Mornay Mahoney has been promoted to vice-president and general manager of Region I of the Sperry Univac International Division.
- James R. Anderson has resigned as senior vice-president and manager of the Teleray Division of Research, Inc.

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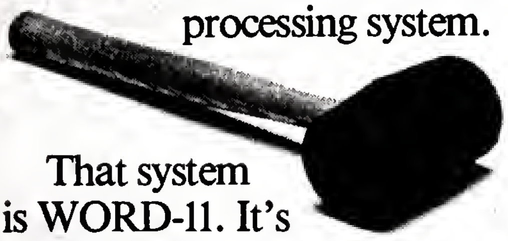

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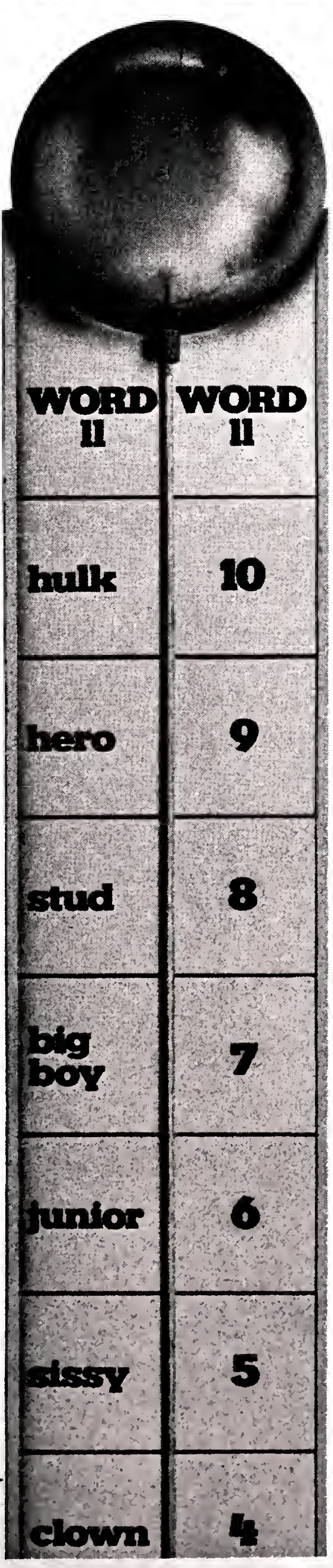

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DOD Official: Competitive Procurement to Stay

CW Washington Bureau

WASHINGTON, D.C. — Discussing a recent congressional decision to exempt the Department of Defense (DOD) from governmentwide computer acquisition regulations, a DOD official renewed assurances the Pentagon will rely on competitive procurements "as much as possible."

Dr. Richard D. DeLauer, undersecretary of Defense for Research and Engineering, acknowledged in an address here that DOD procurement activities will be closely monitored in the wake of the "knock down, drag out" fight the department waged with House Government Operations Committee Chairman Rep. Jack Brooks (D-Texas) for the exemption [CW, July 27].

Brooks unsuccessfully sought to keep DOD bound to the procurement policies and regulations embodied in the 1965 Brooks Act and administered by the General Services Administration. DOD persuaded Congress the regulations were impairing efficient defense acquisitions and thus threatened national security [CW, June 15].

"So far, we're prevailing, but we don't want to win the battle but lose the war," DeLauer said of the dispute in an address at Compcon '81, the international meeting of the Institute of Electrical and Electronics Engineers Computer Society.

"We're certainly going to use competition as much as possible," he said, and pledged to purchase off-the-shelf hardware and software whenever feasible.

Acquisition Costs

He said embedded military computers account for 68% of all DOD hardware and software acquisition costs. That figure will rise to 83% by 1990, when the department will have approximately 260,000 embedded computers, compared with 20,000 today, according to DeLauer.

With that kind of money on the line, he said, "if we fall down on how those things ought to be purchased, we're never going to get [the exemption] back."

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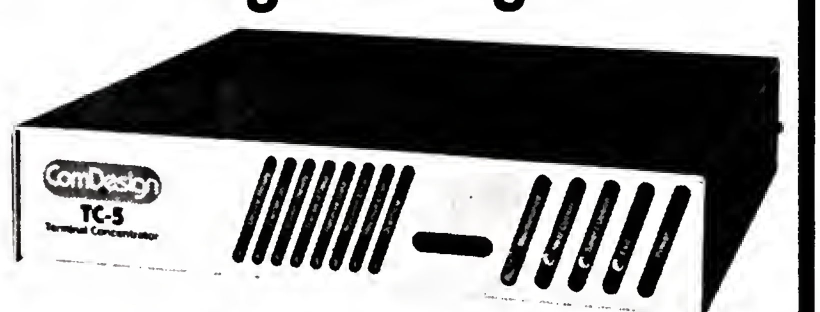

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Contracts & Pacts

Computer Automation, Inc. has received an order for more than 290 of its midrange naked mini computers, valued at approximately $2 million, from Alphatype Corp. of Nile, Ill.

Centronics Data Computer Corp. has entered into a multimillion dollar contract with Raytheon Data Systems Co. for the sale of several models of Centronics serial dot matrix printers.

The U.S. General Accounting Office (GAO) has awarded a five-year multimillion dollar contract to Boeing Computer Services Co. to design, develop and operate a consolidated administrative management information system for the GAO.

Computer Sciences Corp. has received a contract valued at more than $5 million from Chrysler Corp. for software development for the Northeast Corridor Improvement Project. This project of the Federal Rail Administration is aimed at upgrading the passenger service over the heavily traveled rail lines between Washington, D.C., and Boston.

Exidy Systems, Inc. has made an agreement with Compuserve, Inc. to offer the Compuserve Information Services with the sale of Exidy Systems Terminal PAC cartridges.

Sintel Corp. has received its first government defense contract to supply two Sigma Digital Systems, Inc. (a Sintel subsidiary) Onyx 16-bit minicomputers to the U.S. Navy's Surface Weapons Center in Dahlberg, Va.

M/A-Com, Inc. has announced that one of its operating companies, Linkabit Corp., has received a $3.3 million contract from the U.S. Air Force's Rome Air Development Center for the development of a UHF/VHF satellite communications, command and control system.

Kennedy Co. recently signed a $1 million agreement for Series 9000 tape transports with the Test Systems Group of Fairchild Camera and Instrument Corp.

MSI Data Corp. has signed a contract for approximately $6 million with the customer service department at IBM Corp. for hand-held portable data terminals to be delivered within the next year.

Avera Corp. has signed an OEM sales contract with Comsat General Integrated Systems, Inc. for the purchase of Avera computer-aided design workstations.

Becton-Dickinson, Inc. has signed a $500,000 contract with Micropolis Corp. for the firm's Model 1221 8-in. rigid disk drives.

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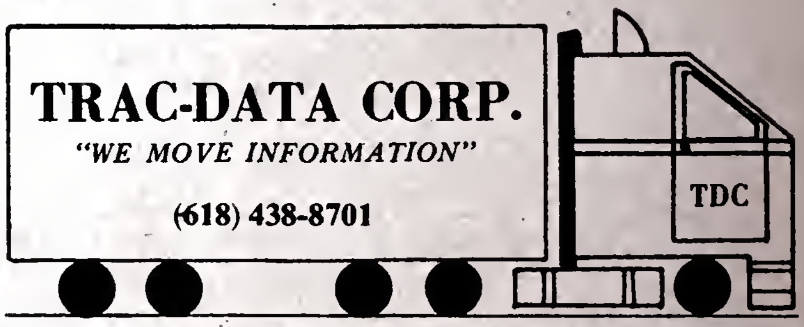

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Supershorts

Lexidata Corp. has shipped its 1,000th System 3400 high-resolution raster display processor. The recipient of the milestone procesoor was Calma Co., a Sunnyvale, Calif. based manufacturer of computer-aided design and manufacturing equipment.

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Digital Equipment Corp. has opened its first "carry in" center for DEC terminals. The center is located at 9730 George Palmer Highway, Lanham, Md. 20801.

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Computer Communications, Inc. (CCI) and Applied Technology Ventures, Inc. announced in a joint statement that agreements in principle have been reached that will allow CCI to prepare a plan of reorganization in the Chapter 11 proceedings that were filed Nov. 6, 1980.

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The Honeywell Foundation of Honeywell, Inc. has awarded Arizona State University's College of Engineering and Applied Science a gift of $400,000 to establish a research trust fund and scholarship program.

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Vector Graphic, Inc. has signed an agreement with Sears, Roebuck & Co. that provides for the sale of the Vector 3 family of small business computer systems and standard Vector software through the recently announced Sears Business Systems Centers.

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Anaconda-Ericsson Information Systems is the new name for the external marketing unit of Anaconda-Ericcson, Inc.'s Communications Division. The group was formerly known as LM Ericcson Telecommunications, Inc.

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Control Data Corp. has been awarded the *Industrial Research and Development Magazine*'s IR-100 award for producing one of the 100 most significant technological advances of 1980 — the CDC Cyber 205 computer, which can perform up to 800 million operation/sec.

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Market Data Systems, Inc. has joined the General Electric Information Services Co. (Geisco) remote computing services network. Geisco provides software and a variety of data through its worldwide network.

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Century Data Systems has delivered its 10,000th Trident T50 removable pack disk drive. The drive was received by Texas Instruments, Inc. and will be used in a DS990 Commercial Business Systems.

— — —

Topaz, Inc. has formed an international division to provide worldwide sales and service of Topaz products. It is located at 9150 Topaz Way in San Diego, Calif. 92123.

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Sperry Univac has established a Manufacturing Resource Center to provide management consulting and executive- and functional-level education for Sperry Univac Manufacturing Control System customers. It is located at Univac headquarters in Blue Bell, Pa.

— — —

Micro-Z Corp.'s hotel reservation system has been chosen to service all hotel reservations for the 1982 World's Fair scheduled to open in Knoxville, Tenn., on May 1.

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R.C. Sanders Technology Systems, Inc. has signed a manufacturing and technology agreement with the People's Republic of China to jointly produce printer parts and character printers.

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The University of Southern Louisiana's computer science master's degree program has become the first in the southern U.S. chosen for inclusion in the Bell Laboratories, Inc. "One Year On Campus" program. The program recruits young scientists to earn a master's degree within one year, with their salary and tuition paid for by Bell.

— — —

AM International, Inc. has relocated its corporate headquarters from Los Angeles to Chicago. The new address is Prudential Plaza, Suite 1005, 130 E. Randolph St., Chicago, Ill. 60601.

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In a move designed to streamline marketing activities, Modular Computer Systems, Inc. has formed two business divisions called the Industrial Systems Division and the Data Systems Division. Both are based in Fort Lauderdale, Fla.

— — —

Dataproducts Corp. said its medium-speed line printer division in Woodland Hills, Calif., will cease manufacturing the firm's 300 line/min Model 2230 drum printer after Jan. 31. It is being replaced by the band printer.

— — —

Candle Corp. has recently established a data center in Los Angeles for product research and development and for internal DP functions.

— — —

Two researchers from Sperry Univac and the University of Minnesota have been awarded a $145,000 grant from the National Science Foundation to develop mathematical techniques applicable to business-oriented problems. They are Dr. Edward McCall and Dr. J.B. Rosen.

New Marketing Concept

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You may already have one of these DBMS's installed on your VAX computer. If you do, you're familiar with some of their many problems: poor documentation, slow execution times, and limited data-base functionality. Above all, you also see user-level features that remind you of the early days of interactive computing.

The cause of these problems is easily explained. Soon after DEC announced the VAX, several companies noticed a great opportunity and rushed to market with their DBMS software. Some of them quickly converted their products to the VAX from other hardware. A few others took their academic research projects and tried to make them viable commercial products. If only good data-base software could be created so easily!

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The voucher comes with your company's name on it and it is not transferable. Therefore, the information that you list on the coupon must be accurate and complete. The voucher expires two months after we formally release our software, so you will have to act promptly when we notify you of the release date.

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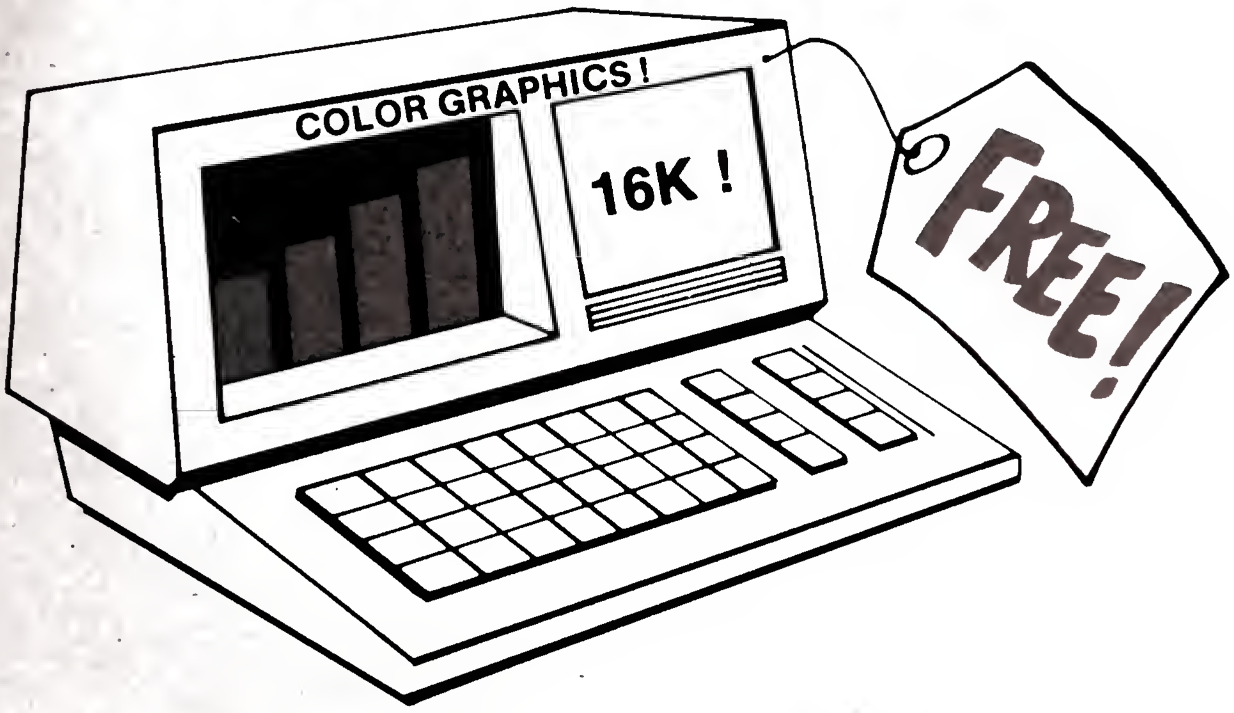
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SR SYSTEMS ANALYST

Fortune 500 firm seeks 7-10 yrs experience in IBM-OS. Must have COBOL, DL/1, CICS and detailed on-line design. Key development situation.
Salary **$30-35,000**

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 S.W. Columbia
Portland, OR 97258
(503) 222-9778

BOSTON

SR MFG PROG/ANALYST

Leading hi-tech mfr seeks COBOL P/A with solid sys exp for new devel of MRP, WIP, inv cntrl. IBM OS or DOS with CICS pref. Oppty to move up to proj ldr. **$28,000**

MFG CONSULTANT

Major mini vendor developing integ multi-plant mfg sys seeks pro with hvy MRP, WIP, Shop Floor exp. This hi-visibility pos interacts with sr plant & MIS mgmt. **$35,000**

EDP AUDIT MGR

Fortune 500 firm seeks take charge mgr for EDP audit staff of 4. Rptg to VP Finance. Indiv will review controls & stds of multi-facility IBM SYS/34 network. **$35,000 + bonus**

MGR SYS & PROGRAMMING

Prominent mfg firm req top calibre indiv to manage staff of 6. IBM DOS/VS, CICS, COBOL environ installing fin'l & mfg packages. Will coordinate with top corp execs. **$38,000**

MIS CONSULTANT

Prominent MIS conslt firm (200+ professionals) seeks Sr P/A to work with Fortune 1000 clients on mfg & fin'l sys. Pref IBM DBMS COBOL bkgrd. Oppty for partnership. **$32,000**

HP-3000 MANAGER

Start-up oppty to install HP-3000 in $100MM consumer goods firm. Will direct initial sys & hire support staff. Ideal situation for proj ldr to move up to mgmt. **$32,000**

SOFTWARE TECH WRITER

Nat'ly recog software firm seeks exp'd writer to prepare customer-oriented product documentation. Any hi-lvl lang pref. This fast growing co offers chance for rapid advancement & diverse assignments. **$23,000**

Gerry Battista
ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

PHOENIX

LEAD DB/DC SPECIALIST

On line project leader experience, involvement in vendor evaluation and selection, systems architecture, distributed data techniques and data dictionary.
Starting salary to **$31,000**

Roc Rogers
ROBERT HALF
of Phoenix
3550 N. Central Ste 1504
Phoenix, AZ 85012
(602) 264-6488

PROVIDENCE

SYS & PROGRAMMING MGR

Maj loc mfr desires sys mgr to direct med size S&P staff in on-line devel. IBM DOS/COBOL/RPGII environ. Corp visibility. Salary **$35,000**

SYSTEMS PLANNER

Leading fin'l inst seeks highly motivated indiv with broad tech skills to assist in analysis of proposed new svcs & eval of maj sys configuration changes. Participate in tech strategy, vendor eval & capacity planning. Advanced Comp Sci degree or proj mgmt exp pref.
Salary **$30,000**

EDP AUDITOR

Fortune 500 co seeks indiv with hvy sys, light acctg bkgrd. IBM sys environ. Knowl of OS, JCL, COBOL & RPG II. Culprit a plus. 40% trvl. Salary **$28,000**

HONEYWELL PROG/ANALYST

Sm RI mfr desires sr prog/analyst to support DP mgr with Honeywell Level 62. Strong RPGII. Knowl COBOL, BOM, MRP & Order Entry.
Salary **$25,000**

BAL PROGRAMMER

Rapidly growing retail org seeks IBM Assembler programmer. COBOL a plus. IBM 4341, 370 environ. Excellent benefits.
Salary **$21,000**

Bob Lathrop
ROBERT HALF
of Providence, Inc.
400 Turks Head Bldg.
Providence, RI 02903
(401) 274-8700

TAMPA

PROG/ANALYST

Major Florida bank has many openings for exp in DDA, loans, checking. Cobol.
To **$25,000**

SYS ANALYST

Major division fortune 500 co wants solid exp in Acctg appl. Prefers IBM will look at others. Data base exp and IMS big plus. To **$30,000**

DIRECTOR

Largest co of its type in FL. Min 7 yrs exp, at least 3 of which as a manager. Large IBM hdwe. Planning, budgets, sys design, hdwe selection, recruiting and training of personnel-retail or wholesale a must. Interpersonal skills very important.
To **$35,000**

Stan Allen
ROBERT HALF
of Tampa, Inc.
1311 North Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

HARTFORD

DP EDUCATIONAL CONSULTANT

Next step up for EDP instructor with strong proj leadership & conceptual abilities. Maj IBM instal in scenic Conn area seeks solid COBOL exp. IMS, CICS a plus. New suburban HQ. Salary to **$31,500**

PLANNING ANALYST

Hi-visibility with challenging combin of planning & implem. State-of-the-art client seeks solid hardware planning, 3033 exp, TP & software, & effective interpersonal skills. Cent Conn.
Salary to **$30,000**

INSURANCE SYSTEMS

Proj ldrs — share your tech expertise of ins sys on this multiple-person proj. Assembler & COBOL within IBM/OS/MVS instal mandatory. Actuarial sys exp a plus. Rural Conn loc. Salary **$31,000**

SR EDP AUDIT

Internat ind'l client seeks exp'd EDP auditors to expand their expertise in audit control. Oppty, trvl & growth. Solid industrial audit bkgrd req.
Salary to **$33,000**

SYSTEMS PROGRAMMER

Conn shoreline oppty for person with Burroughs sys software knowl with data ctr of Fortune 100 industrial. Exp with telecommunications & mini computers a plus.
Salary to **$30,000 +**

SYSTEMS SOFTWARE

Conn oppty for IBM trained MVS indiv to direct future enhancements in multiple CPA expansion. Excellent co in suburban loc. Salary to **$35,000**

DATA BASE ANALYSTS

Lge expansion in DP/DC dev projs! Conn oppty for IMS apps spec's to provide internal consulting to multi-div client.
Salary to **$29,000 +**

Stan Durbas
Paul Meissner
Carol Wilson
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

TULSA

PROG/ANALYST

Challenging spot for a winner with the right specs. Must have 3 yr exp, prior seismic or geophysical bkgrd, FORTRAN or Assembler. Our client has contracts with large oil co & is running on DEC equipment, RXS-II. Will relocate. **$33,000**

ROBERT HALF
of Oklahoma, Inc.
5840 S. Memorial Drive,
Suite 217
Tulsa, OK 74145
(918) 627-1600

SEATTLE

PROG/ANALYST

Several current openings in banking, insurance, transport, healthcare and energy firms in Alaska, Montana and Washington. Require large scale IBM and Burroughs COBOL business applications experience. Relocation allowance.
Salary to **$30,000**

Ray Magill
ROBERT HALF
of Seattle, Inc.
600 University St.
Suite #2328
Seattle, WA 98101
(206) 624-9000

BUFFALO

SR ANALYST

Cent NY co needs min 2 yrs ins sys bkgrd for subsidiary. Hvy BAL req for modifying & impl life ins pkgs. Will be member of payroll proj team. COBOL, TSO helpful. **$26,000**

PROJECT MGR

Hi-visibility corp pos for consumer goods mfr loc W NY. Ideal candidate has impl MRP in multi plant facility. Must come from tech side incl shop floor, order entry & acctg apps. Sophisticated IBM shop.
$35,000

SR PROG ANALYST

Progressive DP shop needs savvy COBOL prog with min 3 yrs exp. Exposure to IMS helpful. Co willing to train in mfg sys area. Pos 30% analysis. Oppty to be exposed to entire proj from sys flow charting to documenting. **$25,000**

SR SYS ANALYST

Proj presently underway to impl mfg sys in multi plant environ. Bkgrd must incl lge sys orientation & ability to work with little supv. Up-thru-the-ranks record. Excellent career path. **$31,000**

SYS & PROG MANAGER

Sophisticated IBM shop needs proj mgr to supv expanding prof staff. Ideal bkgrd is proj organization: staffing, scheduling, etc. Lge main-frame req. Proven mgmt abilities nec.
$40,000

Pam Siegal
ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bank Building
Buffalo, NY 14202
(716) 842-0801

DENVER

SYSTEMS PROGRAMMER

Major Denver company located in beautiful Colorado suburb seeks a person with DEC training and background. Tops 20 DMS 20, transaction processing system are some keys to this excellent position.
Start **$35,000** range

SR PROGRAMMER/ANALYST

Prominent Denver transportation company seeks an IBM SYS 38 person with min 5 yrs COBOL exp. Any data base experience is helpful. Position offers strong promotional path.
Start **$30,000** range

ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO 80202
(303) 629-1010

COLUMBUS

PROGRAMMER

A vigorous and growing computer department with state-of-the-art projects. These positions are due to economic growth and DP expansion. Columbus is a low cost area with many white collar growth industries. Applicants should possess 2 yrs experience with business applications, Basic plus II, RSTS/E, PDP-1170. Total is a real plus. Excellent benefits, life, health, dental, profit sharing, etc.
Salary **$15-22,000**

Kurt Hopwood
ROBERT HALF
of Columbus, Inc.
88 East Broad St., Suite 1150
Columbus, OH 43215
(614) 221-9300

ROBERT HALF

ALBUQUERQUE

PROG/ANALYST

Progressive Albq IBM 370 shop. Requires CICS exp in either OS or DOS. Very professional environment.
Start **$24,000**

RPG

Very successful New Mex retail chain. Professional environment. Any System 34 exp in RPG II. Start **$23,000**

Dick Stamas
ROBERT HALF
of New Mexico
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

GREENSBORO

PROGRAMMERS

Great oppty for 2 yr Cobol progs to be Proj Leader. Large MVS shop. To **$22,000**

SYSTEMS PROGRAMMER

Blue chip corp seeks 2 yr Tech Prog with large IBM MVS or OS experience. SNA a plus.
To **$32,000**

PROGRAMMERS

Excellent co has openings for 1 yr exp BAL or Cobol on large IBM OS. To **$20,000**

Larry Brooks
ROBERT HALF
of North Carolina, Inc.
Wachovia Building
Suite 1117
Greensboro, NC 27401
(919) 274-2448

DALLAS

SENIOR SYSTEMS ANALYST

Blue Chip corporation looking for a strong leader. Will guide the development of a major CICS project. Must have 5 yrs programming experience including at least 2 yrs CICS.
To **$35,000**

ANALYST PROGRAMMER

Commitment to real time systems has generated need for an individual proficient in CICS. Looking for min 3 yrs IBM OS or DOS COBOL programming ability. To **$30,000**

John Staiger
ROBERT HALF
of Dallas, Inc.
Two Northpark East, #750
Dallas, TX 75231
(214) 363-3300

SOUTH FLORIDA

TELECOMMUNICATIONS CONSULTANT

This is your chance to team up with an industry leader with a consistent policy of promoting from within. Billion dollar International Corporation based in Miami has urgent need for a Data Telecommunications expert to design and implement telecommunications systems in its various divisions. Your experience in Hardware/Software Networks is essential. Extensive travel involved, approximately 50%. Superb benefits included among the many fringes offered. Fee paid.
Salary to **$36,000**

Chuck Nell
Bonnie Gouz
ROBERT HALF
of Miami, Inc.
1395 N.W. 167th Street
Suite 100
Miami, FL 33169
Dade (305) 625-5433
Broward (305) 764-1550

SOUTHERN CALIFORNIA

SUBURBAN LOS ANGELES

If your bkgrd is the development of large communications or financial systems using IBM OS-COBOL, TSO, SPF, as a SR P/A or Proj Leader you could lead the development of new business systems in a state of the art environ. 15 miles from the beach. Fee pd.
To **$35,000**

Joe Reese
Ajay Berry
ROBERT HALF
of Los Angeles
3600 Wilshire, Suite #2000
Los Angeles, CA 90010
(213) 386-6805

ORANGE COUNTY

NEWPORT BEACH

MIS CONSULTANT

Major international CPA firm has super oppty in their consulting group for poised, action oriented individual with strong technical background, good communication skills and 2+ years experience. Degree required. Fee pd.
To **$35,000**

Al Handler
ROBERT HALF
of Orange County
2333 N. Broadway, #200
Santa Ana, CA 92706
(714) 835-4103

COMMERCE

PROGRAMMER/ANALYST

Entertainment firm. Solid OS-COBOL skills and a strong financial applications bkgrd are the keys. CICS exper is a plus. Fee pd. To **$30,000**

Bob Dack
ROBERT HALF
of Los Angeles
6252 E. Telegraph
Commerce, CA 90040
(213) 721-2197

CHICAGO

PROGRAMMER/ANALYST

Suburban Chicago, blue chip international manufacturer has experienced dynamic growth. With IMS-DBDC, COBOL experience you can join a "state of the art" OS/MVS shop. Excellent in house training. Call for an interview. **$28,000**

George Thomas
Sandra White
Robert Hendrix
ROBERT HALF
of Chicago, Inc.
35 E. Wacker
Chicago, IL 60601
(312) 782-6930

DAYTON

SYS PROG

Major mfg offers excell oppty for the sys Pro w/telecommunications, OS/VSI & VTAM or VSAM exp. Assembler a++. This is a "State of the Art" IBM shop interested in staying at the leading edge of the ind. Full fringes. Fee paid.
$27-30,000

ROBERT HALF
of Dayton, Inc.
First National Plaza
Dayton, OH 45402
(513) 224-0600

KANSAS CITY

SR MIS PLANNER

Newly created corporate planning function seeks an experienced MIS Planner. Become immediately involved in long range planning, feasibility studies and project planning. Prior experience in large scale systems and hardware evaluation required. Good verbal and written communications skills a must. Excellent visibility to major corporate exec's with promotion possibilities throughout the whole corporation. Salary **$35,000**

MANAGER

Rapidly expanding Midwest distributor seeks a shirt-sleeve manager to take over conversion from GSD to DPD division. Familiarity with RPGII and knowledge of COBOL on the 4331 preferred. Build your own staff. Work directly for the VP of Finance. Salary **$34,000**

LEAD ANALYST

Nationally known K C firm seeks a degreed analyst to take complete charge of the evaluation and installation of a new corporate general ledger package. Prior experience with accounting systems required. Ability to work with end-users and evaluate current general ledger packages required.
Salary **low $30's**

MANAGEMENT SERVICES

National consulting firm seeks a degreed individual with multiple programming languages and design experience. Person must possess good communication skills and the ability to analyze client needs and recommend appropriate solutions. Must be capable of working in diverse main-frame environments. Salary **$32,000**

PROG/ANALYST

Excellent Kansas City firm offers the opportunity for you to move to a System 38. Need solid RPGII skills and System 34 experience. Super benefit• and bonus package.
Salary **$25,000**

George Waterman
ROBERT HALF
of Kansas City, Inc.
127 W. 10th
Kansas City, MO 64105
(816) 474-4583

MINNEAPOLIS/ ST. PAUL

MAS DIRECTOR

Unique oppty for a unique individual. Client is a regional CPA firm located in a mid-sized Upper Midwest community. They need an exp'd MAS consultant to develop an MAS practice. You should know the mini market well.
Salary **Upper-$30's to Low-$40's**

MANAGER TECHNICAL SUPPORT

Our client has need for an exp'd technical support manager. Qualifications desired include: strong technical knowledge of the IBM DOS/VSE software; either CICS or Taskmaster, and expertise w/at least one database. Must have mgmt exp. Client has a rapidly expanding shop and offers a solid challenge.
Salary to **Low-$40's**

Ron Dykstra
Sue Hawkins
ROBERT HALF
of Minnesota, Inc.
2236 IDS Center
Minneapolis, MN 55402
(612) 339-9001

MILWAUKEE

MIS DIRECTOR

Are you a high-performance individual who is seeking that extraordinary opportunity? This is an aggressive, well-respected company that can respond actively. Experience with DEC PDP 11/70 hardware and ability to develop and coordinate manufacturing and financial systems are recognized assets. **$30-35,000**

DATA PROCESSING MANAGER

Is your advancement keeping pace with your achievement? Good abilities and ideas can go far with this dynamic, well-organized company. Large IBM experience & data base design are assets. MAPICS background beneficial. **$26-33,000**

Larry Lapetina
Richard Bird
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of Wisconsin, Inc.
777 E. Wisconsin Avenue
Milwaukee, WI 53202

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PROGRAMMER/ANALYST

IMS people needed in Tennessee. 6 months experience on up. Company has purchased new division. Will negotiate salaries and relocation.

PROJECT LEADER

Solid experience in leading manufacturing projects. IBM/COBOL preferred. Absolutely excellent relocation package. Position in Tennessee.
Salary to **$33,000**

DP MANAGER

Install, design, and manage System 34 shop. Located in resort location in Mississippi. One man shop.
Salary to **$28,000**

ROBERT HALF
of Memphis, Inc.
825 Ridge Lake Blvd.
Suite 350
Memphis, TN 38119
(901) 683-5834

ATLANTA

DP DIRECTOR

Redirect present system. Select new hardware. Good communicator. **$40,000**

PROG/ANALYST

Consumer prod mfr. Pref bkgrd of systems 3/15D RPGII.
$25,000

PROG/ANALYST

Metal prod mfr seeks bkgrd of IBM series 1; mfg apps.
$23,000

PROG/OPERATOR

Pref bkgrd of syst 34 and RPGII.
$23,000

PROG/ANALYST

Mfr comm prod seeks solid bkgrd or RPGII Syst 34/32.
$20,000

PROGRAMMER

Maint of bus apps for large industrial prod mfr. **$20,000**

ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd NE
P.O. Box 10201
Atlanta, GA 30319-0201
(404) 266-2153

NEW YORK

COBOL LEARN CICS

Firmly established in its field this company has had a remarkable history of growth and accomplishment. 3+ years COBOL programming with design and analysis experience. CICS experience is a plus but company will train. Envir is 4341. Highly visible position in growing data center. **$28,000**

PROJECT LEADER

If you like trail-blazing this could be the position you've been looking for. 6+ years in EDP with heavy systems design, ON-LINE, COBOL programming and management experience. Supervise project team in development of Trading system. Giant conglomerate recently involved in merger.
$42,000

RPG II SYSTEM 34

Highly visible position in the largest firm of its kind. 2+ years RPGII programming and interactive experience. System 34 experience is a definite plus. Environment is dual SYSTEM 34s, SYS 3, and DATAPOINT ARC system. Planning development of new network. Plush.
$26,000

PROJ MGR HONEYWELL

Multi-faceted experience will pay dividends with this idea oriented company. 2+ years COBOL Programming, HONEYWELL and management experience. Supervise 6-8 in conversion to ON-LINE in brand new installation. Environment is HONEYWELL LEVEL 66. Benefits include BONUS, dental and thrift plan. **$30,000**

BIG 8 CPA CONSULTANT

Unlimited growth potential with this renowned firm. 3+ years design, programming, and implementation of business systems using MICRO computers, strong ACCOUNTING knowledge and excellent oral and written communications skills. CPA certification is a definite plus. Oversee installation of personal computers in office environment. Challenging. **$34,000**

DIGITAL ANALYST

Excellent upper level opportunity with this well-known UTILITY FIRM. 3+ years ON-LINE REAL TIME applications experience and software and hardware evaluation experience. Part of Corporate project management team to evaluate all hardware and software and make recommendations. Excellent management benefits.
$35,000

Marty Amato
ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

LOUISVILLE

PROJECT MANAGER

This position requires someone who can develop a close working relationship with the Marketing Dept personnel, identify information systems development and manage the total project effort, including analysis design, implementation and staff direction. 5-10 yrs experience and MBA required. Salary to **$42,000+**

BAL PROGRAMMERS

Major Fortune 500 is looking for programmers with BAL experience. A manufacturing background with CICS. Excellent relocation package and benefits. Salary to **$34,000**

PROGRAMMERS

Louisville and surrounding area firms are looking for COBOL and Assembler programmers with 1 or more years experience.
With degree salary to **$26,000**
With no degree salary to **$23,000**

Tom Williams
ROBERT HALF
of Louisville
680 South Fourth St.
Louisville, KY 40202
(502) 585-1751

ST. LOUIS

PROGRAMMER ANALYST

Multi-faceted firm located in scenic Ozark area (100 mi west of St. Louis) seeking 5 P/A's. 3 Sr/level (three yrs COBOL/BAL), 2 Junior/Level (one to two yrs COBOL/BAL). Co has IBM 4341, DOS/VSE plus several TI 990/20's. Insurance exp a+. Beautiful area.
To **$25,000**

SYSTEMS MANAGER

Must have strong system design experience in a manufacturing, IBM 370 Environment. IMS, CICS, DL I very helpful. Will supervise staff of professionals designing and implementing interactive mfg systems. Excellent fringes include 100% pd education expenses. Top St. Louis Company. **Low 30's**

SR SYSTEMS SOFTWARE CONSULTANT

Consult with clients regarding systems software performance, enhancements, security. Major, stable accounting/consulting firm. Opportunity to travel. Dynamic firm, unlimited growth potential.
To $30,000 + Bonus

SYSTEMS PROGRAMMER

Multi-conglomerate manufacturing firm seeks exp with Lg IBM, OS/MVS, CICS. DLI a plus. Design, implement, and supervise major projects. Challenging position. To **$28,000**

Delores Cook
Randy Pace
ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

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Our Research & Development facility is in North Carolina's Research Triangle Park, which offers superior living and recreational opportunities, and the cultural resources of three great universities. We need more creative professionals to keep us growing. Projects with immediate openings include:

ENGINEERING SOFTWARE
Availability, reliability, and maintainability of hardware and software are high priority concerns for in-house development, field engineering, and manufacturing. We are developing logic tests, functional tests, exercisers, and design verification routines. We also want people to help develop strategies for testability assessment, VLSI device testing, and CAD tool development.

ADVANCED DBMS
We are developing a relational Data Base Management System able to operate in both centralized and distributed environments. We are emphasizing procedural language interfaces, user interfaces, and highly available database processors.

COMPILERS
We build programming language products in a high-level language using state-of-the-art optimizing compiler technology, on a high-level-language machine.

PROGRAMMING SYSTEMS
We are developing an interactive programmer's workbench for each language on the system; these will be closely integrated with the language translator and runtime systems.

CAD PRINTED CIRCUIT BOARDS
We need a CAD/PCB specialist who can design state-of-the-art multilayer digital boards and help us prepare for future technological advances.

OPERATING SYSTEM
We are developing operating systems for both conventional and distributed environments. These systems will incorporate advanced concepts in virtual memory management, process structuring, and database support, as well as highly available file systems and data protection. We specifically need a senior individual who can contribute technical leadership to all aspects of our design and development, and take responsibility for I/O and communications.

If you're in one of these areas, or if you like the total picture and feel you can contribute, call Linda Roll collect at (919) 549-8421, or send your resume, with salary history, in confidence to:

Personnel Department
Data General Corporation
62 T.W. Alexander Drive
Research Triangle Park, NC 27709

An Equal Opportunity Employer M/F/H

TELECOMMUNICATIONS OPPORTUNITIES

The Upjohn Company, a worldwide manufacturer of pharmaceuticals, chemical and agricultural products is seeking individuals for the following positions:

MANAGER, CORPORATE TELECOMMUNICATIONS

This position is accountable for the creation, formulation, and management of all telecommunication activities. In addition, this position participates in several project teams such as Office Automation and consults with many company units regarding telecommunication systems. Candidates must possess a Bachelor's degree in Electrical Engineering, Telecommunication, or Computer Science with a minimum of 8 years experience in the telecommunication field with experience in both voice and data communication.

TELECOMMUNICATIONS, SPECIALIST-VOICE

This position will assist in the process of establishing a complex corporate network. Position requires a degree in Electrical Engineering, Computer Science, or Telecommunication and strong background in voice systems and network, with exposure to data communications.

We are located in Kalamazoo, Michigan, a medium sized university city with numerous cultural and recreational advantages. We offer excellent benefits, relocation assistance, and an opportunity for career growth.

Please send resume in confidence to:
Jerry L. Flowers
13735-B
The Upjohn Company

Upjohn

7000 Portage Road Kalamazoo, Michigan 49001

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PROGRAMMERS

The Chicago Board of Trade, the world's largest commodities futures exchange is seeking bright, motivated people for its Management Information Systems staff.

Cobol Programmer

Write and debug CICS command level and COBOL programs. Two to three years solid experience working with CICS and COBOL required. Individual should be familiar with IBM OS/VS1, JCL, and Utilities but those familiar with IBM DOS will be considered.

Tandem Programmer

Individual will program a TANDEM 16 computer. Minimum one year experience using TAL language required. Prior experience and or exposure to data communications concept and technique is helpful.

We offer a competitive salary and excellent company paid benefits. For further information send resume and salary history to Debra Dena, The Chicago Board of Trade, LaSalle at Jackson, Chicago, IL 60604.

Equal Opportunity Employer, M/F.

Opportunities In Information Systems

Atlanta Suburban Area

As a Division of a Fortune 400 company, we enjoy undisputed leadership in our industry. Innovation and growth mean interesting career challenges for the professionals who join us now.

Our company is launching a new drive further into leading edge technology information systems such as distributed processing, decision support and state-of-the-art manufacturing and distribution systems.

Manager Of Information Systems

Candidates should have several years of experience and involvement in data systems, a good educational background and the desire to contribute to an executive team on the move.

Systems Programmer

Qualifications include a minimum of 3 years experience supporting major data base/data communications systems and OS operating systems. Current environment is an IBM 370/168 and 4341-2 running MVS, ENVIRON-1, VTAM, TOTAL, TSO, ROSCOE and LIBRARIAN. Experience with the ENVIRON-1 and TOTAL is a definite plus.

Send resume with salary requirements to:

DEPT. O-7C
3301 Buckeye Road, Suite 102
Atlanta, Georgia 30341

Equal Opportunity Employer M/F/V/H

SYSTEM PROGRAMMER

Los Alamos National Laboratory is seeking a System Programmer desiring a challenging career opportunity. Responsibilities involve working as a team member in one or more of the following areas: design, implement, and maintain the Common File System application programs, support the IBM MVS operating system and the IBM 3850 Mass Storage System.

B.S. degree in computer science or closely related technical field and/or demonstrated equivalent professional level experience in computer system programming required. Experience in one or more of the following areas highly desirable: structural language programming, MVS operating system, and IBM 3850 Mass Storage System.

The laboratory is a multi-faceted national R & D organization operated by the University of California for the Department of Energy. We provide excellent working conditions and benefits including 24 days' annual vacation. Located in the forested mountains of northern New Mexico, we offer an ideal setting for living, working, and recreation. Surrounded by spectacular natural beauty, you can enjoy a pollution-free environment; casual, uncrowded living; an outstanding school system; and low taxes.

Send resume, in confidence, to:

Charles Mikkelson
DIV 81-CM
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

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SOFTWARE TECHNICAL WRITER

Software AG of North America is a world leader in data base management technology. We are seeking an additional software technical writer to produce high quality user documentation. If you are the right person you will be a qualified software technical writer with at least 2 years experience in software documentation. You will possess a degree or equivalent, be highly motivated and able to work with little or no supervision. This is an opportunity to join a dynamic, expanding company. In addition to a highly competitive salary and excellent benefits we offer a real opportunity for growth. If you feel you are qualified, send your resume including career objectives and salary history to

Ken Western
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The selected professional will supervise approximately five exempt data processing employees, in an IBM 370/158 environment with OS/MVS, CICS, TSO/STF, Panvalet/SPF, JES 2, OS/JCL, COBOL and System 200 data base.

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The University of Texas Medical Branch (UTMB) has created the Office of Academic Computing and Biostatistics and is seeking candidates for the position of Director. UTMB is the oldest health science center in the University of Texas System. Its academic schools include Medicine, Nursing, Allied Health Sciences, and the Graduate School of Biomedical Sciences. UTMB's research programs are rapidly expanding, and its support capabilities, including academic computing, must be improved and enlarged to facilitate this academic growth.

The Office of Academic Computing and Biostatistics will be part of the School of Medicine, and the Director will report to the Office of the Dean of Medicine. The individual chosen for this position will be responsible for all aspects of the development and organization of computing service capabilities in support of research and education. This includes the selection of appropriate computer modes to meet the needs of individual faculty, the provision of programming and systems analysis support, and the provision of biostatistical consulting and research design capabilities. The Director of this new office will work closely with the Director of the Service Computation Center, the business and hospital computing center. in addition, the Director will be responsible for the long-term planning and development of academic computing capabilities consistent with the research and educational goals of the institution. The Office will consist of a Director, two Associate Directors (Computer Services and Biostatistical Services) and programming and clerical staff sufficient to provide the appropriate level of services.

Candidates for the position of Director should have a thorough understanding of both computing and biostatistical needs of faculty and an ability to successfully integrate these functions, an understanding of academic medical centers, a record of accomplishment in managing either academic computing of biostatistical services in a university setting, academic credentials sufficient to obtain a faculty appointment in the School of Medicine, and effective interpersonal skills.

The salary will be in the range of $45,000 to $55,000 depending upon qualifications; excellent fringe benefits are provided.

Please send a current curriculum vitae and a letter indicating your specific interest in the position to:

Julian I. Kitay, M.D.
Associate Dean for Curricular Affairs
Office of the Dean of Medicine
Suite 528, Administration Building
University of Texas Medical Branch
Galveston, Texas 77550

The deadline for the receipt of applications is October 26, 1981.

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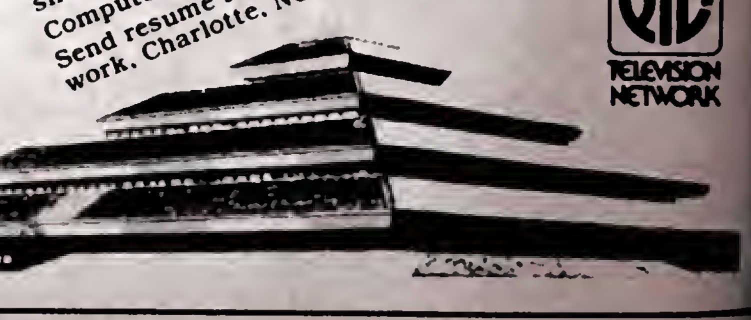

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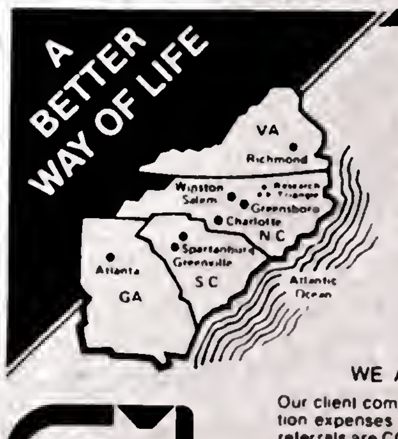

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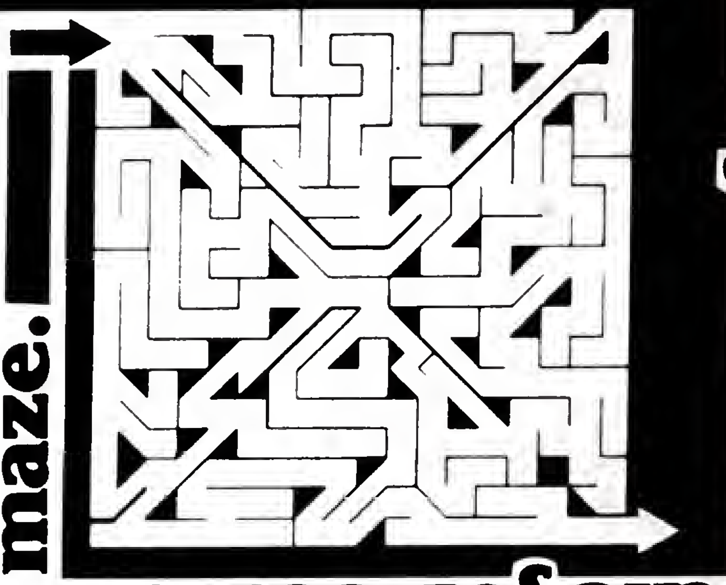

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- experience in large scale on-line financial systems design and implementation.
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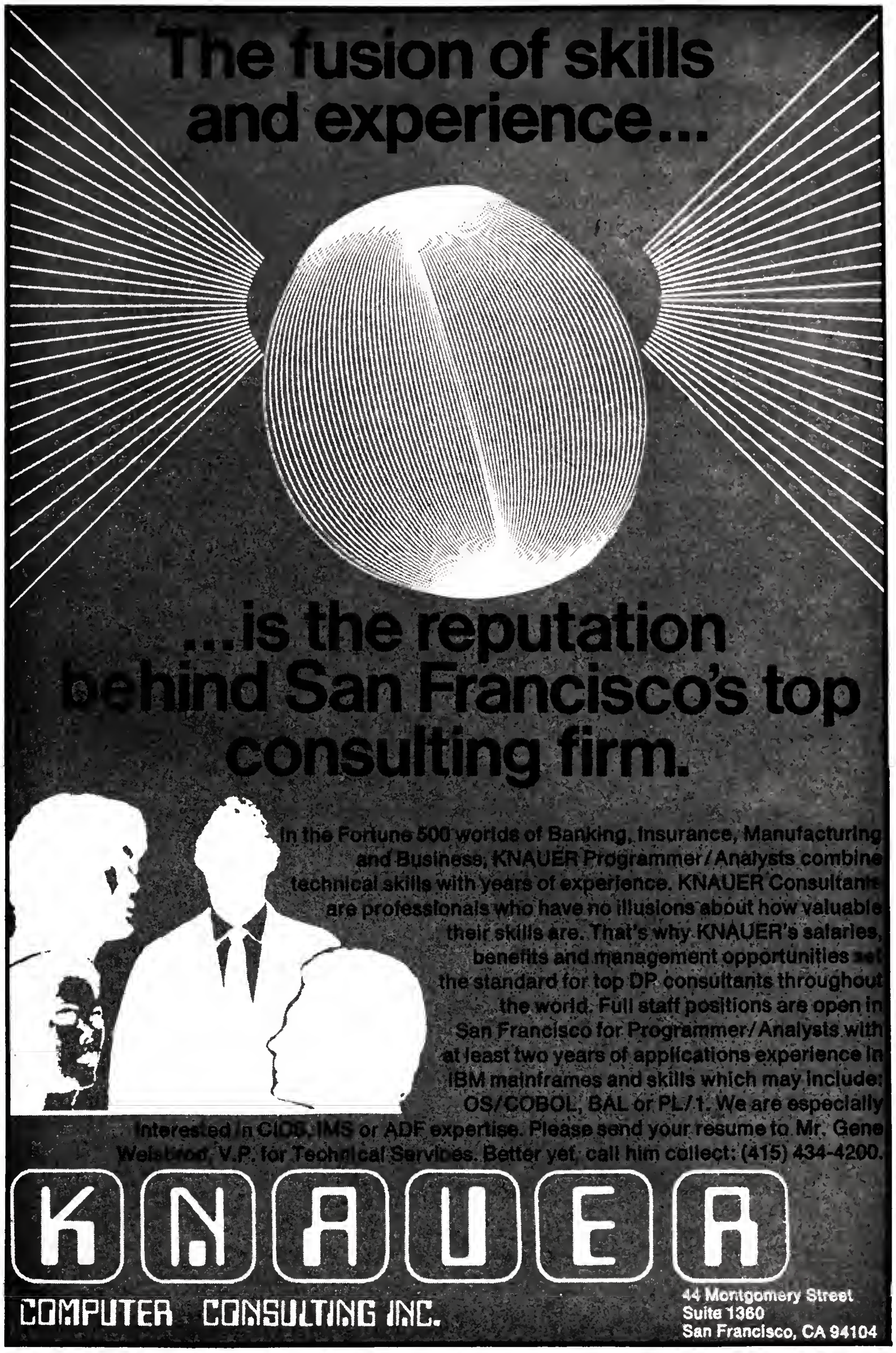
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Data Processing

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VP SYSTEMS & PROGRAMMING

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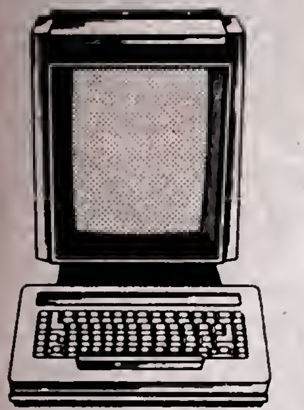

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For more information, contact Personnel, Department of Natural Resources, Pouch M, Juneau, Alaska 99811.

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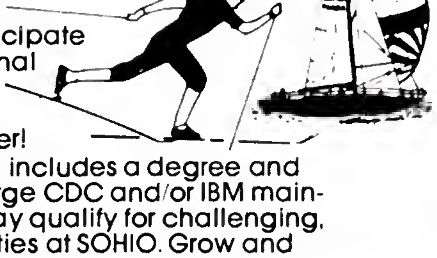

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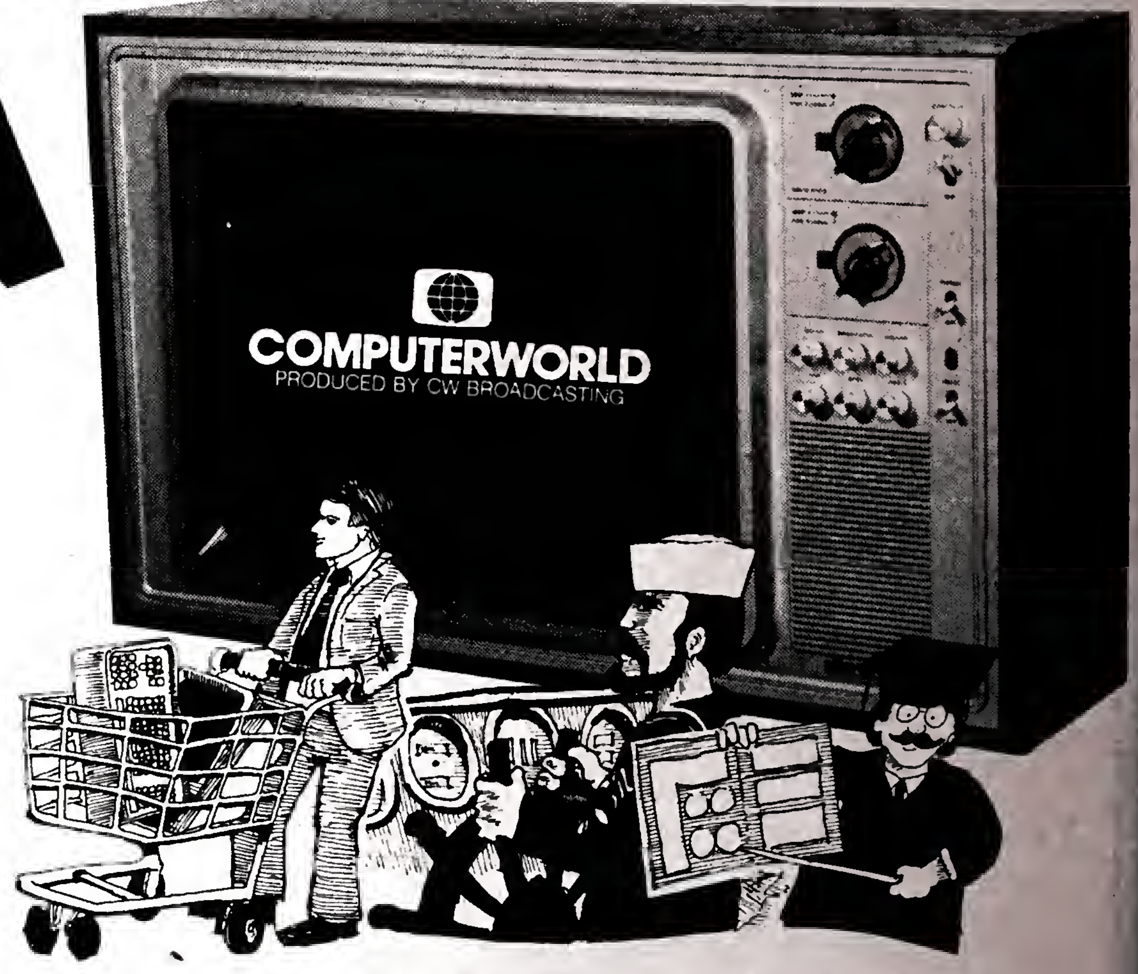

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- How to Select Your Own Micro — Part II
- Simulated Ships Use Computers to Train Captains
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San Francisco	KTSF	26	Sat	9:30 AM
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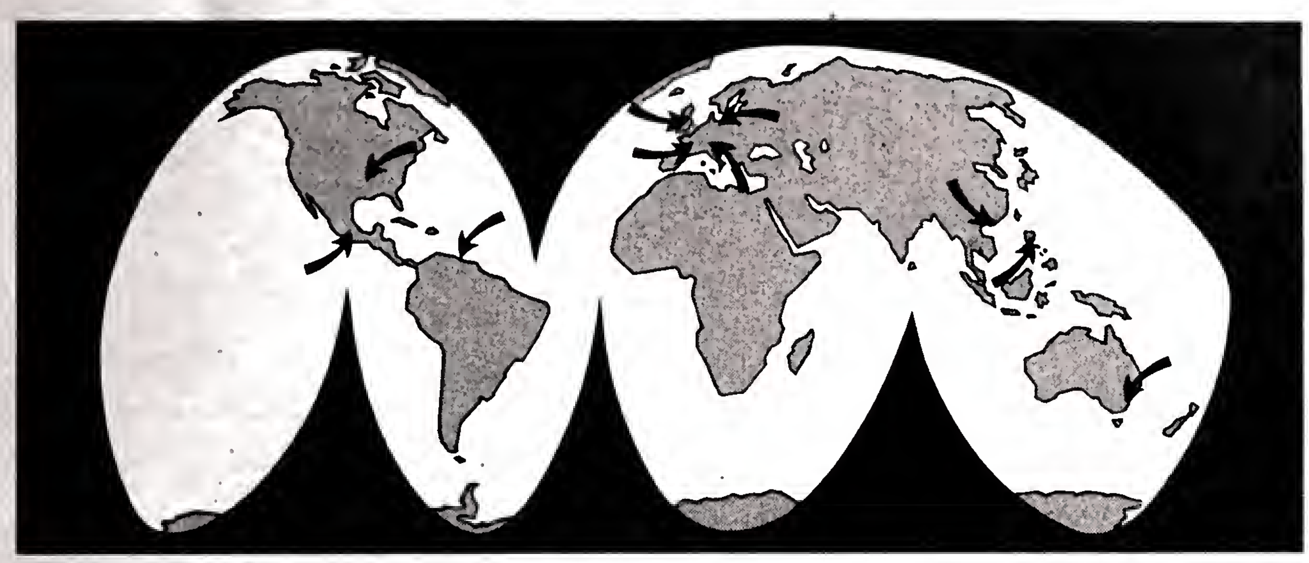

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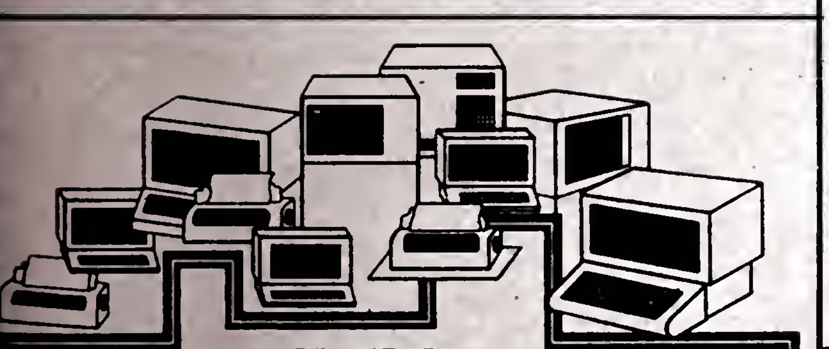

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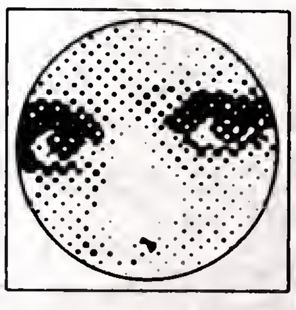

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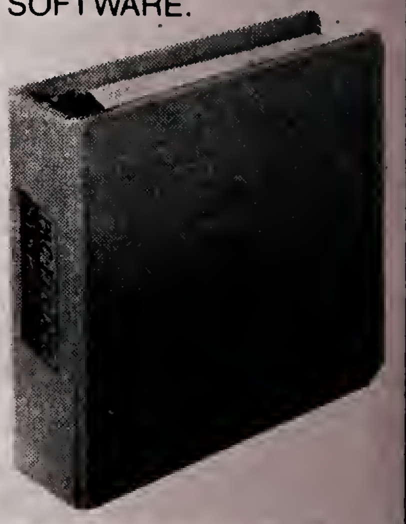

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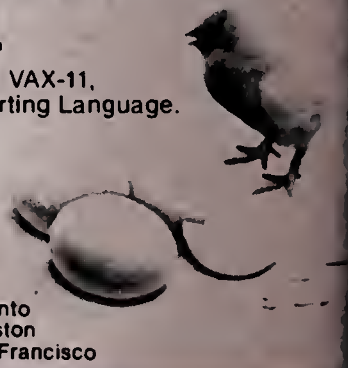

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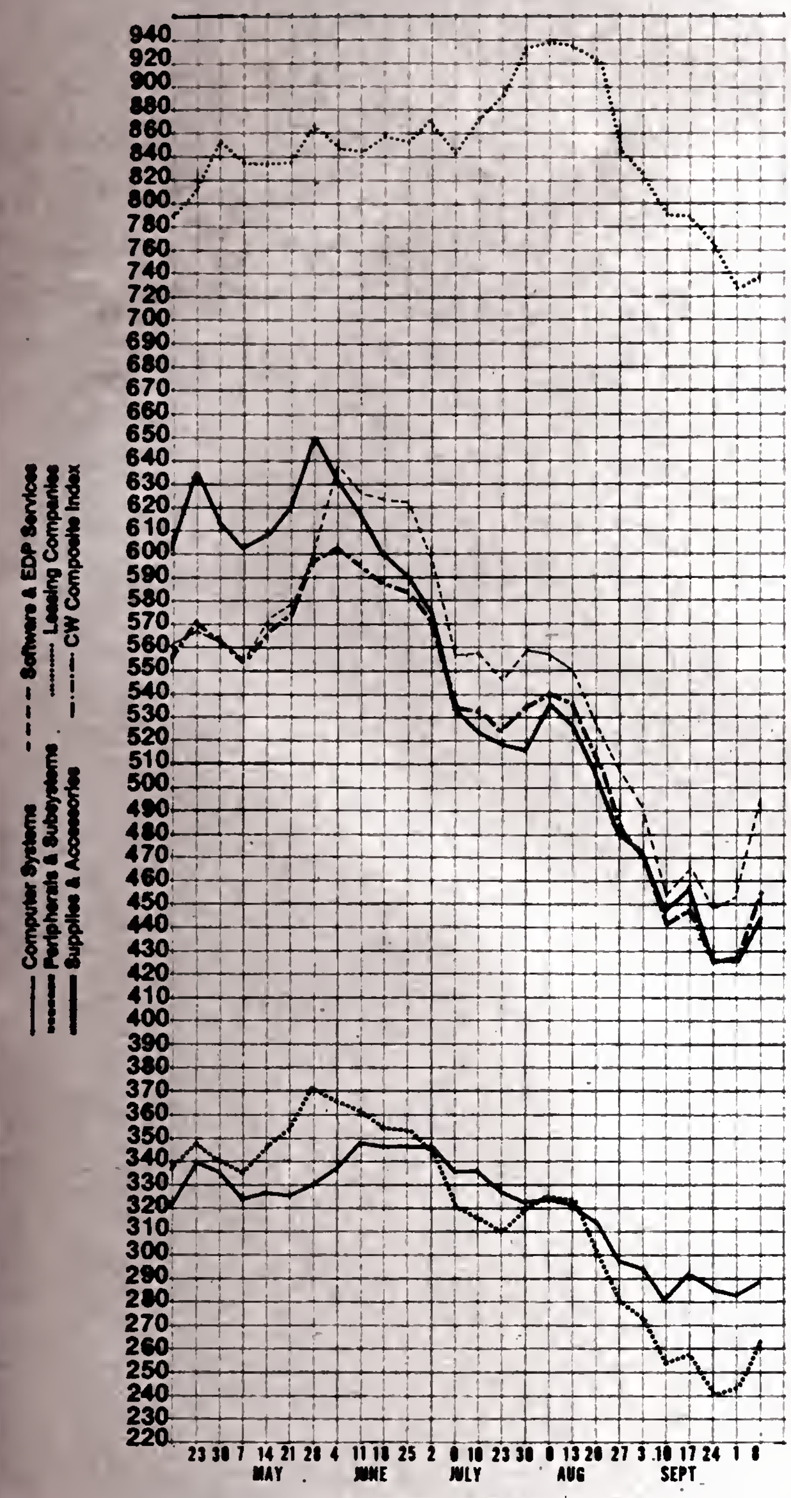

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Vice-President/Circulation

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 7, 1981

All statistics compiled, computed and formatted by
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COMPUTER SYSTEMS

EXCH		PRICE 1980-81 RANGE (1)	CLOSE OCT 7 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	23- 48	28 3/4	+2 1/2	+8.5
N	BURROUGHS CORP	29- 72	28 3/4	-1 1/2	-4.8
O	COMPUTER AUTOMATION	9- 28	10 1/4	+ 3/4	+7.8
N	CONTROL DATA CORP	60- 84	68 7/8	+4 3/4	+7.2
N	CRAY RESEARCH INC	28- 48	36	+4 3/8	+13.8
N	DATA GENERAL CORP	42- 87	52	+3	+8.1
N	DATAPOINT CORP	40- 68	48 1/2	+1 3/4	+3.7
N	DIGITAL EQUIPMENT	80-113	82 5/8	+3 3/8	+3.7
A	EECO INC	7- 18	8 1/2	+1 3/8	+18.2
N	ELECTRONIC ASSOC.	5- 13	5 3/8	+ 5/8	+13.1
N	FOUR-PHASE SYSTEMS	18- 48	30 1/2	+2 1/4	+7.8
N	FOXBORO	42- 62	42 1/4	-1 1/4	-2.8
O	FULCRUM COMP GRP	0- 0	3/8	- 1/8	-25.0
O	GENERAL AUTOMATION	7- 18	7 3/4	0	0.0
N	HARRIS CORP	39- 80	40 3/8	+1 3/4	+4.5
N	HEWLETT-PACKARD CO	33- 54	43	+1	+2.3
N	HONEYWELL INC	78-115	83 3/4	+2 1/8	+2.8
N	IBM	53- 73	55	+ 7/8	+1.8
O	MAGNUSON COMP SYSTS	12- 32	15 3/4	+4	+34.0
N	MANAGEMENT ASSIST	11- 28	11 5/8	+ 1/4	+2.1
O	MINI-COMPUTER SYST	1- 4	1	0	0.0
N	MODULAR COMPUTER SYS	8- 32	8 3/8	- 1/2	-5.8
N	MOHAWK DATA SCI	11- 32	14	+ 3/4	+5.8
N	NCR	47- 78	48 3/8	+ 5/8	+1.3
N	PRIME COMPUTER INC	18- 48	23	+2 1/8	+10.1
N	PERKIN-ELMER	21- 38	24	+1	+4.3
N	SPERRY CORP	31- 65	32 3/8	-1	-2.8
O	TANDEM COMPUTERS INC	13- 35	28 1/2	+2	+7.2
N	TEXAS INSTRUMENTS	81-151	81 5/8	-1 1/4	-1.5
A	WANG LABS.	23- 46	28 7/8	+2	+7.4

LEASING COMPANIES

EXCH		PRICE 1980-81 RANGE (1)	CLOSE OCT 7 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	18- 29	23	+1 1/4	+5.7
N	COMDISCO INC	18- 24	18 5/8	+1 7/8	+10.5
O	COMMERCE GROUP CORP	1- 2	7/8	+ 1/8	+18.8
O	COMPUTER INVSTRS GRP	1- 4	1/4	- 1/8	-33.3
O	CONTINENTAL INFO SYS	4- 9	5 3/8	+ 1/4	+4.8
A	DCL INC	3- 4	3 3/8	0	0.0
N	DPF INC	5- 12	8 1/2	+1 1/8	+13.4
O	ITEL	1- 15	1/2	0	0.0
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 6	3 1/4	+ 1/4	+8.3
N	RELIANCE GROUP INC	65- 99	80 1/2	-2 1/2	-3.0
N	U.S. LEASING	18- 30	21 1/2	-1 1/2	-6.5

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EXCH		PRICE 1980-81 RANGE (1)	CLOSE OCT 7 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	3- 6	3 3/4	+ 1/8	+3.4
O	ADVANCED SYSTEMS INC	10- 15	11 1/4	+ 1/4	+2.2
O	ANACOMP INC	11- 19	12 3/4	+ 1/2	+4.0
O	ANALYSTS INTL CORP	3- 14	5 1/2	+1	+22.2
A	APPLIED DATA RES.	13- 25	17	+2	+13.3
N	AUTOMATIC DATA PROC	22- 32	27 3/8	+1 7/8	+7.3
O	CGA COMPUTER ASSOC	4- 25	5 1/2	+ 1/2	+10.0
O	COMPUTER HORIZONS	1- 5	2 1/4	+ 1/2	+28.5
O	COMPUTER NETWORK	4- 9	4 1/4	+ 1/8	+3.0
N	COMPUTER SCIENCES	14- 30	14 1/2	+ 3/8	+2.6
O	COMPUTER TASK GROUP	13- 23	15 1/2	+1 1/4	+8.7
O	COMPUTER USAGE	2- 10	3 1/8	+ 5/8	+25.0
O	COMSHARE	7- 21	9	+ 1/2	+5.8
O	CULLINANE DATABASE	29- 69	59 1/2	+7 1/2	+14.4
O	DATA DIMENSIONS INC	1- 4	3/4	0	0.0
O	DATATAB	2- 4	1 1/2	- 1/4	-14.2
O	DSI CORP	4- 9	5 7/8	+ 3/8	+6.8
O	DYATRON CORP	4- 11	4 3/8	0	0.0
N	ELECTRONIC DATA SYST	15- 30	24	+ 1/2	+2.1
O	INFORMATICS INC	17- 34	23 1/4	+4 1/2	+24.0
O	INSYTE CORP	1- 3	2 1/8	+ 3/8	+21.4
O	IPS COMPUTER MARKET.	1- 4	1 3/4	0	0.0
O	KEANE ASSOCIATES	4- 8	5	0	0.0
A	LOGICON	23- 38	27 1/4	+3 7/8	+16.5
O	MNGT SCI AMER INC	17- 26	20	+1 1/2	+8.1
O	MATHEMATICA INC	12- 19	16 1/4	+3	+22.6
O	MATHEMATICAL APP GRP	15- 28	19	+1 1/2	+8.5
O	NATIONAL DATA CORP	14- 28	18 1/2	+1 7/8	+11.2
N	PLANNING RESEARCH	5- 13	6 3/4	+1 1/4	+22.7
O	PROGRAMMING & SYS	1- 2	1 1/4	0	0.0
O	RAPIDATA INC	5- 12	11 3/4	+1 1/2	+14.6
O	REYNOLDS & REYNOLD	16- 26	19 1/4	+2 3/4	+16.6
O	SEI CORP	17- 28	21 1/4	+1 1/2	+7.5
O	STSC INC	8- 28	9	+ 3/4	+9.0
O	SCIENTIFIC COMPUTERS	8- 16	9	+1	+12.5
O	SOFTWARE AG	11- 23	14 1/2	+1 1/4	+9.4
N	TYMSHARE INC	26- 58	28 7/8	+1 3/8	+5.0
A	URS CORP	11- 18	11 1/2	+ 5/8	+5.7
N	WYLY CORP	7- 20	8 1/4	+ 1/8	+1.5

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1980-81 RANGE (1)	CLOSE OCT 7 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	6- 25	6 7/8	+ 1/4	+3.7
A	ANDERSON JACOBSON	10- 26	11 7/8	+1 3/8	+13.0
O	AUTO-TROL TECHNOLOGY	10- 62	10	+ 1/4	+2.5
O	BEEHIVE INT'L	6- 18	9 1/8	+2 1/8	+30.3
A	BOLT,BERANEK & NEW	9- 25	12 1/4	+2 3/4	+28.8
O	CAMBEX CORP	2- 9	3 3/4	+ 1/4	+7.1
N	CENTRONICS DATA COMP	7- 40	10 5/8	+1	+10.3
A	CETEC CORP	4- 9	4 1/4	+ 1/4	+6.2
O	COMPUTER DEVICES INC	4- 10	4 5/8	0	0.0
O	COGNITRONICS	4- 11	4 7/8	- 3/8	-7.1
O	COMPUTER COMMUN.	1- 8	1 3/8	+ 1/8	+15.0
A	COMPUTER CONSOLES	20- 28	22	+ 7/8	+4.1
O	COMPUTER TRANSCEIVER	3- 9	5 3/4	0	0.0
N	COMPUTERVISION CORP	20- 49	33 1/8	+1 1/8	+3.5
N	CONRAC CORP	17- 28	23 5/8	- 3/8	-1.5
A	DATA ACCESS SYSTEMS	5- 23	6 1/8	+ 5/8	+11.3
A	DATAPRODUCTS CORP	18- 44	21	- 1/2	-2.3
O	DATUM INC	2- 5	1 7/8	+ 1/8	+7.1
O	DECISION DATA COMPUT	3- 8	3 1/8	+ 1/8	+4.1
O	DELTA DATA SYSTEMS	2- 4	2 1/2	+ 1/8	+5.2
O	DATARAM CORP	4- 15	5 5/8	+ 7/8	+18.4
N	ELECTRONIC M & M	3- 9	3 1/8	0	0.0
O	EVANS & SUTHERLAND	18- 40	30	+4 1/2	+17.6
O	FABRI-TEK	2- 8	3 5/8	+ 1/4	+7.4
O	GENERAL COMPUTER SYS	1- 12	5 3/4	+ 1/4	+4.5
N	GEN'L DATA COMM IND	9- 19	8 1/2	0	0.0
O	GENERAL TERMINAL CP	1- 4	1	0	0.0
N	HAZELTINE CORP	19- 35	18 1/2	+ 3/8	+1.8
O	INFORMATION INTL INC	8- 17	10 3/4	+1 3/4	+18.4
O	INTEL CORP	23- 51	25 1/2	+1 1/4	+5.1
O	IPL SYSTEMS INC	8- 15	7 3/4	+1 3/4	+28.1
A	LUNDY ELECTRONICS	8- 18	9 1/2	+ 7/8	+10.1
A	MSI DATA CORP	11- 27	18 1/4	+ 3/8	+2.3
N	MEMOREX	8- 18	11 5/8	+1 1/4	+12.0
O	NETWORK SYSTEMS CORP	14- 25	17 3/8	+2 1/8	+13.8
O	OMEX	2- 12	12	0	0.0
N	PARADYNE CORP	25- 52	40 3/8	+2	+5.2
A	PENRIL CORP	9- 17	9 3/4	+ 7/8	+8.8
O	RAMTEK CORP	8- 23	10 1/4	+ 1/4	+2.5
N	RECOGNITION EQUIP	7- 21	7 1/4	+ 1/8	+1.7
O	SCAN DATA	1- 5	1 1/4	- 1/8	-9.0
N	STORAGE TECHNOLOGY	18- 38	34 1/8	+1 1/2	+4.5
O	SYKES DATATRONICS	8- 29	24	+2 3/4	+12.9
A	T BAR INC	12- 19	13	+ 1/2	+4.0
A	TEC INC	4- 7	4 1/4	+ 1/8	+3.0
N	TEKTRONIX INC	46- 70	48	+ 7/8	+1.8
N	TELEX	5- 8	5 5/8	+ 1/2	+8.7
O	TESDATA SYSTEMS CP	6- 17	6 5/8	+ 1/2	+8.1
A	TIMEPLEX INC	10- 19	10 3/8	- 1/8	-1.1
O	WILTEK INC	1- 3	2	+ 3/4	+80.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1980-81 RANGE (1)	CLOSE OCT 7 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	12- 17	11 5/8	+ 1/8	+1.0
O	BALTIMORE BUS FORMS	1- 2	1	0	0.0
N	BARRY WRIGHT	15- 24	16 1/2	+1 3/4	+11.8
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 17	12 1/2	0	0.0
N	ENNIS BUS. FORMS	15- 23	19 5/8	+ 3/4	+3.9
N	3M COMPANY	49- 65	49 1/4	- 3/4	-1.5
O	MOORE CORP LTD	27- 38	30 1/2	+ 3/4	+2.5
N	NASHUA CORP	17- 33	17 5/8	+1	+6.0
O	STANDARD REGISTER	30- 41	32 1/2	+1 3/4	+5.8
A	TAB PRODUCTS CO	15- 30	15 5/8	+ 1/2	+3.3
N	WALLACE BUS FORMS	22- 31	27 1/8	- 3/4	-2.8

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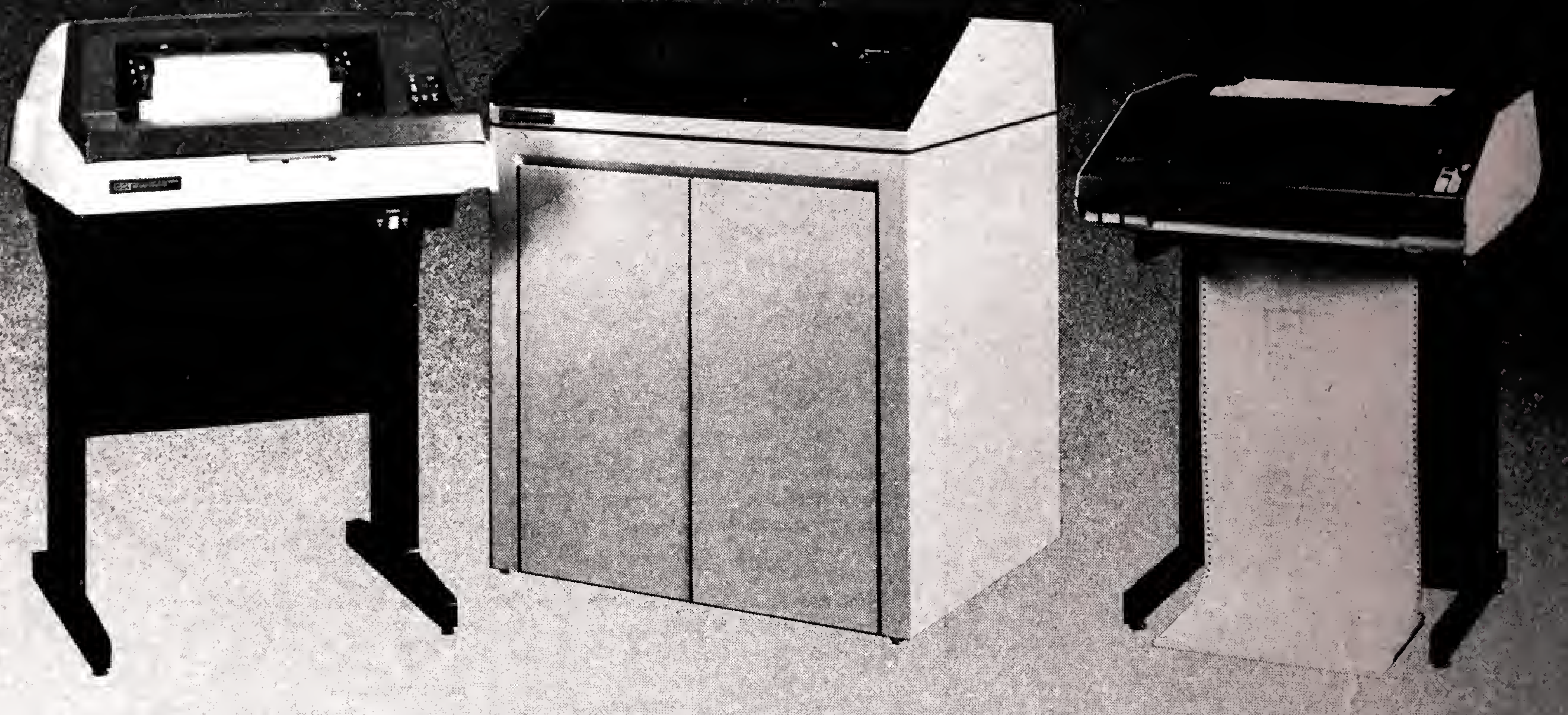

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- __ QT series (600, 1000, 1200 lpm heavy duty band printers)
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